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KALA AZAR.

ADLER (S.). **An Analysis of the Leishmania Sandfly Problem.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Nov. 25. Vol. 23. No. 3. pp. 289–300. [29 refs.] [Microbiol. Inst., Hebrew Univ., Jerusalem.]

Though strains of leishmania readily develop in certain species of Phlebotomus, variations are found in the degree to which invasion of the proboscis occurs. In certain endemic centres of oriental sore, dogs commonly contract the disease, e.g., Baghdad, while in others the canine disease is unknown, e.g., Palestine. Similarly in the Mediterranean area dogs and very young children commonly suffer from kala azar while in India the disease does not occur in dogs and is rarely if ever seen in young children. Arguing from these facts the author concludes that in localities where oriental sore and kala occur in young children and dogs, which are unable to crush sand flies on the skin, infection is caused by the bites of these insects. It is in these localities that the leishmania show a marked tendency to invade the proboscis of the flies. On the other hand, where adults alone are most usually infected the leishmania have little tendency to invade the proboscis of the fly, and infection is by crushing on the skin, resulting in inoculation of the wound or conveyance of infective material to the conjunctiva. It is evident that even if development leads to infection of the proboscis and renders transmission by bite a possibility infection might also occur by crushing. According to this view in Palestine *Leishmania tropica* has adapted itself imperfectly to *P. papatasii* and the infection is usually by crushing while in Baghdad the parasite is adapted to *P. sergenti* to a higher degree and is transmitted by the bite. In India *L. donovani* develops in *P. argentipes* and in China in *P. chinensis* and it would seem that in these countries infection by the bite may occur, but the failure to produce the disease in this way after very many attempts in experimental animals suggests that crushing may be the usual method of infection. Similarly in the Mediterranean area transmission is by the bite of sand flies.

It is noted that *L. tropica* becomes pathogenic to man after eight days in *P. papatasii* kept at a temperature of 19° C. to 23° C. and after six days in *P. sergenti* at 27° C. The intestine in the case of *P. papatasii* and *P. argentipes* is bacteriologically sterile, a fact that renders these sand flies suitable hosts of leishmania. Insects which harbou bacteria can safely be excluded as vectors. In the case of *P. papatasii* naturally

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occurring infection with *L. tropica* has been found and identified by production of oriental sore in man inoculated with the flagellates. Though leptomonads have been seen in *P. sergenti* their identity with the leishmania of man has not been proved since indistinguishable infections may be produced by the leishmania of geckos. Human inoculations have not succeeded in this case. As a result of inoculation experiments, it is concluded that the leishmanias of man and dogs may be regarded not as clearly defined species but as strains which are undergoing evolution under various circumstances, for there is no simple character by which one so-called single species can be constantly differentiated from another.

C. M. Wenyon.

Shortt (H. E.), Smith (R. O. A.), d'Silva (H. A. H.) & Swaminath (C. S.). *Leishmania donovani* **in Human Faeces in Indian Kala-Azar.**—*Indian Jl. Med. Res.* 1929. Oct. Vol. 17. No. 2. pp. 644–646. With 1 coloured plate. [4 refs.]

A boy, 8 years of age, had been treated for kala azar in 1928 with thirty injections of sodium antimony tartrate. In August 1929 he again came up for treatment, and parasites were found by liver puncture. Dysentery of the bacillary character developed. The stools contained very scanty faecal material and much mucus and blood. Microscopically there was a heavy cellular exudate including blood cells and a scanty bacterial content. Films stained by Giemsa revealed typical leishmania on two successive days. Nearly all the slides examined showed one or more parasites, usually singly but sometimes in small groups. The coloured plate of the parasites leaves no doubt as to their nature. This is the first authentic record of the discovery of leishmania in the stools of a patient.

C. M. W.

Shortt (H. E.), Craighead (A. C.), Smith (R. O. A.) & Swaminath (C. S.). *Phlebotomus argentipes* **caught in Nature infected with** *Leishmania donovani.*—*Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 913–914. [1 ref.]

In 1926 Shortt, Barraud and Craighead recorded the natural infection with *Leishmania donovani* of a specimen of *Phlebotomus argentipes* taken in a kala azar house in Assam (this *Bulletin*, Vol. 24, p. 133). With a view to amplifying the work, flies were collected from kala azar houses at intervals during the period March 28th to August 30th, 1928. Only a few specimens are as a rule caught at any one visit. Of 226 flies dissected, 7 proved to be infected with kala azar. [It is evidently these observations which were referred to by Napier and which the reviewer questioned (see above, p. 91).]

C. M. W.

Shortt (H. E.), Craighead (A. C.), Smith (R. O. A.) & Swaminath (C. S.). **Preliminary Transmission Experiments in Indian Kala-Azar not involving the Use of an Intermediate Vector.**—*Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 915–920. [4 refs.]

The uniformly negative results which have attended all experimental attempts to transmit kala azar by the bites of infected sand flies led

the authors to test other methods of transmission. ADELHEIM (1924) had already shown that a healthy mouse became infected after being kept in a jar with one which had been experimentally infected (this *Bulletin*, Vol. 22, p. 203). This experiment was repeated in a slightly modified form. Cages were wired together in pairs and in one cage of each pair was placed an infected hamster and in the other a healthy one. Six such pairs were used and each pair was placed in a large earthenware vessel which was purposely not cleaned, the cages gradually rising on the accumulating food material in the form of gram. The experiment was continued for about a year when the originally healthy animals were examined. Two examined one year and two days after the commencement of the experiment were found to be very heavily infected. In one case the originally infected hamster had died in just under three months from the beginning so that infection of the healthy animal must have occurred before this. Twenty hamsters were fed repeatedly on the deposit from the centrifuged urine of untreated cases of kala azar and twelve on gram contaminated with similar deposit but none became infected.

C. M. W.

SHORTT (H. E.), CRAIGHEAD (A. C.), SMITH (R. O. A.) & SWAMINATH (C. S.). **Third Series of Transmission Experiments in Kala-Azar with** *Phlebotomus argentipes.—Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 921–927. [1 ref.]

In a previous paper (this *Bulletin*, Vol. 26, p. 322) the authors describe an experiment in which an attempt to transmit kala azar to four volunteers by means of infected *Phlebotomus argentipes* failed. In the present paper a second experiment with seven volunteers and a arger number of infected flies is described. The seven volunteers had never been in a kala azar area and, as in the first experiment, precautions were taken to exclude other sources of infection. By the dissection of a certain number of flies after each feed and noting the proportion of infected individuals amongst them an estimate of the probable number of infected flies fed was made. The flies used were exclusively those having their third or subsequent feeds as it seemed unlikely that flies at an earlier stage can be infective, for it is after the second feed that the heavy infections of the anterior part of the alimentary tract occur.

As will be seen from the table the result of this second experiment was, as in the first, negative. It is pointed out that the intensity of feeding by flies was immensely greater than would ever be obtained under natural conditions. The examination of the volunteers was by liver puncture and culture of the material in N.N.N. medium. At the time of writing the paper, 18 months had elapsed from the commencement of the experiment, but it is noted that a lapse of a considerable time will be required before it can be regarded as definitely negative.

While the above experiment was in progress, it was necessary to feed the sand flies on mice when they were not required for the human experiment. In this way, six mice were bitten by probably infected sand flies to the numbers of 245, 227, 77, 37, 14, 20 respectively. The feeding extended to approximately one year in each case, but no infection resulted. It was thought that the ingestion of blood other than that of man might cause the organisms in sand flies to lose their virulence. Accordingly, an experiment was carried out in which

TABLE I.

Showing details of transmission experiments with human volunteers and *Phlebotomus argentipes*.

Volunteer.	Date of commencement of experiment.	Date of last exposure to bites of flies.	Date of examination by liver puncture.	Number of separate occasions on which bitten and largest number of flies fed on one occasion.	Total number of flies fed.	Number of flies known to be infected.	Number of flies known to be not infected.	Probable number of infected flies.	Results.
U. Moris Brenlow ...	25–1–28	28–2–29	23–4–29	54/98	1,561	77	233	397	Negative.
U. Wilan Rees ...	30–1–28	1–3–29	,,	48/219	2,049	88	230	520	,,
U. Niza	1–2–28	26–2–29	,,	52/184	1,838	95	255	463	,,
U. Edren	3–2–28	26–4–29	No examination by liver puncture.	9/95	230	17	36	58	Experiment discontinued on 26–4–28 as he was found to be suffering from pulmonary tuberculosis.
U. Muharell ...	6–2–28	21–2–29	23–4–29	48/141	1,687	72	234	429	Negative.
U. Mana ...	8–2–28	23–2–29	,,	46/125	1,673	73	197	425	,,
U. Sivarwell ...	1–6–28	19–2–29		33/104	1,259	47	191	320	Negative. Taken on in place of U. Edren, after the latter was discharged.

sand flies infected from a kala azar case were fed exclusively on human blood till their final feed on mice. Three mice were used, and the probably infected flies fed numbered 4, 4 and 6 respectively. No infection resulted.

The amount of work involved in these experiments is well illustrated by the number 273,467, which is the number of flies bred out. Of these 79,939 were fed in the laboratory. As a result of the failure to produce infection the authors remark that they can only suppose that some essential factor in the process of infection has been omitted or that a vast amount of labour has been expended during a period of five years on an insect which is not an essential link in the chain of infection. The failure of any of the subjects of experiment to show infection, while fresh infections were daily coming for diagnosis from the surrounding towns and country-side is very difficult of explanation if the theory of Phlebotomus transmission is to be maintained.

C. M. W.

NAPIER (L. Everard) & GUPTA (C. R. Das). **The Value of a Provocative Dose of Pentavalent Antimony in the Diagnosis of Kala-Azar.**—*Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 749–753. With 1 chart in text. [2 refs.]

CHOPRA had noted that when antimony preparations were injected into the vein in an animal there was a considerable increase in the size of the spleen, and that the normal rhythmical contractions were considerably increased. This effect was far more noticeable with the therapeutically more active pentavalent compounds than with sodium antimony tartrate. It was suggested that by this means the spleen was flushed out, and that this flushing might be a step in the curative process. Napier and SMITH in 1927 during sand fly experiments allowed the sandflies to feed immediately after an injection had been given on the assumption that the parasites in the blood would have increased in number. Later CHOPRA and Gupta (this *Bulletin*, Vol. 25, p. 423) described the appearance of parasites in the blood after injections of compounds of antimony, and considered that the drugs had a provocative action. In the present paper the authors describe a series of observations on fifty definitely diagnosed cases of kala azar. Before the administration of neostibosan parasites were found in the blood of six, the ordinary thin film being used. Five minutes after the injection parasites were found in thirteen cases and ten minutes after in twenty. After twenty and thirty minutes the positive cases had fallen to eight and nine respectively. The number of parasitized cells before was ten and after was seventeen for five minutes, and thirty-four for ten minutes. In twenty and thirty minutes the number had fallen to thirteen and fourteen. The increase is so marked that it would be worth while adopting the procedure to facilitate diagnosis when the more certain methods cannot be employed.

C. M. W.

TEDESCHI (Carlo). Un caso di leishmaniosi interna familiare in territorio di Derna. (Appunti di nosografia Cirenaica.) [**Familial Kala Azar in the Derna District, Cyrenaica.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Feb. 1. Vol. 11. No. 2. pp. 65–75. With 7 text figs. English summary (5 lines) p. 76. [Colonial Hosp., Derna.]

In 1917 PATANÈ described the first properly diagnosed case of kala azar from Tolmetta in Tripoli. During the three years 1927–1929 there

came to the author's notice 33 cases which on clinical grounds were probably cases of the disease. Four of these were in adults 23 to 35 years of age, and the others in children 20 months to 10 years of age. For various reasons the author was unable to establish the diagnosis by puncture of the spleen. Parasites were, however, discovered subsequently by RAUDO in one of the cases. Later two cases were met with at Derna and these were of interest as they were in a girl 20 months of age and her father who was about 40 years of age. Both these were diagnosed by spleen puncture. The mother, 25 to 30 years of age, was also very ill with fever and anaemia but it was only possible to take a blood film, which revealed many altered red blood corpuscles.

C. M. W.

FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE, TRANSACTIONS OF THE SEVENTH CONGRESS, BRITISH INDIA, 1927. Vol. 3. pp. 1–97. [11 **Papers on Kala Azar.**]

[In many cases the papers are merely preliminary notes of work which has been fully described in journals issued during the two years which have elapsed between the congress and the publication of its Transactions.]

1. **The Kala-Azar Transmission Problem and the Factor of Resistance** [KNOWLES (R.)].—pp. 1–11. [51 refs.]

Knowles discusses the kala azar transmission problem and the factor of resistance, and he suggests that the failure to transmit the disease by infected sand flies may be due to a natural resistance which must be lowered before infection will occur. In the case of human beings, the frequency with which kala azar becomes evident after typhoid fever or malaria is noted while ACTON'S experience of never seeing kala azar associated with leucoderma in which hyper-adrenia occurs may indicate that a hypo-adrenia is an essential factor. It seems possible that in endemic areas of the disease there is wholesale inoculation with the parasite, but only a small proportion of individuals develop kala azar.

2. **The Life-History of *Leishmania donovani* in its Insect and Mammalian Hosts** [SHORTT (H. E.)].—pp. 12–18.

Shortt describes the life history of *Leishmania donovani* in its insect and mammalian hosts. The details of this development have been published elsewhere.

3. **Kala-Azar Studies in North China** [YOUNG (Charles W.) & HERTIG (Marshall)].—pp. 19–23. [12 refs.]

Young and Hertig review the work they have carried out in North China, an account of which has already been published in a series of papers.

4. **The Experimental Transmission of Oriental Sore (causing Generalized Infection) in Laboratory Animals** [Gupta (B. M. Das)].—pp. 34–35. [4 refs.]

Das Gupta described the successful infection of a guineapig and two mice with *Leishmania tropica*. The animals were killed 92 days after inoculation with cultures and all showed a visceral infection.

5. **The Action of the Pentavalent Compounds on the *Leishmania donovani* Parasites** [Acton (H. W.) & Chopra (R. N.)].—pp. 36–43.

Acton and Chopra discuss the action of pentavalent antimony compounds on the parasite of kala azar. The parasites live largely in the reticulo-endothelial system of the spleen, liver and bone marrow and rarely in that of the skin. The parasites are destroyed by antimony compounds, but slowly when in the skin. This suggests that antimony is capable of stimulating the reticulo-endothelial tissues and producing substances harmful to the parasites. The bone marrow is also stimulated by the increase of leucocytes which digest the parasites which are not in endothelial cells. The rhythmic contractions of the spleen which follow administration of antimony compounds probably release parasites from heavily infected cells and permit of their destruction by leucocytes. The increased function of the adrenals caused by the injections produces marked dilatation of the vessels of the liver and spleen. This means increased permeability of the vessel wall and diminished permeability of the reticulo-endothelium, with consequent restriction of the nutrition of the parasites and their starvation. In cases resistant to antimony it is the failure of the tissues to respond in the manner indicated which prevents a cure. It is not known whether the increase in blood sugar which follows a course of treatment affects the nutrition of the parasite.

6. **The Clasmatocyte in Experimental Kala-Azar** [Cash (J. R.) & Hu (C. H.)].—pp. 44–61. With 2 plates (1 coloured). [21 refs.]

Cash and Hu discuss the part played by the clasmatocyte in experimental kala azar in the hamster. By the use of certain colloidal dyes Sabin and her co-workers have concluded that the monocytic phagocytes are composed of two distinct types of cell: the clasmatocytes, which arise from specialized endothelium; and the monocytes, which arise from reticular cells widely distributed in the tissues. The large mononuclears of the blood are regarded as monocytes. The two varieties should not be grouped together. Accordingly the reticulo-endothelial system of Aschoff includes the endothelial system composed of fixed and wandering endothelial phagocytes and the reticular system composed of monocytes only. Investigation of the cells infected with leishmania has shown the authors that these are only clasmatocytes and that in these cells alone do the parasites multiply. The occasional presence of parasites in other cells is more or less accidental, as shown by their failure to reproduce. The distribution of the parasites gives support to the view that the two types of phagocytic cell are of distinctly different origin. The presence of large numbers of infected clasmatocytes in the skin of hamsters and one human case is of interest. It has frequently been seen that a small vessel is completely surrounded

by a mantle of parasitized clasmatocytes, the nuclei of which are in a mitotic condition. This suggests that extravascular multiplication of these cells occurs.

7. **Studies upon the Peripheral Blood, Bone-Marrow and Spleen of Hamsters experimentally infected with Kala-Azar** [Hu (C. H.) & Cash (J. R.)].—pp. 62–76. With 1 chart in text & 2 figs. on 1 plate. [4 refs.]

Hu and Cash have investigated the cause of anaemia in kala azar, and have found that hamsters differ from human beings in that severe anaemia, and consequently serious impairment of health, does not occur. Sabin and her associates have shown that a close genetic relationship exists between clasmatocytes and the red blood corpuscles which are formed intravascularly from the endothelium lining collapsed capillaries of the bone marrow. It is not surprising therefore that in a disease which affects primarily the clasmatocytes, production of red blood corpuscles is impaired. In the hamster suffering from experimental kala azar there is a marked extra-medullary formation of red blood corpuscles, whereas in infected human beings this does not occur. No explanation is offered as to why the infection should prevent this in human beings and not in hamsters, for in other conditions there is a striking degree of extra-medullary blood formation. The observations do not explain the anaemia in human cases, but afford further evidence of the genetic relationship existing between the clasmatocytes and the red blood corpuscles and the blood-forming potentialities of endothelium in those areas of the body where the characteristic lesions of kala azar are found.

8. **The Presence of *Leishmania donovani* in the Skin and Subcutaneous Tissue in Cases of Kala-Azar** [Cash (J. R.) & Hu (C. H.)].—pp. 77–79. [2 refs.]

Cash and Hu have already called attention to the occurrence of leishmania in the skin of human beings and hamsters suffering from kala azar (this *Bulletin*, Vol. 25, p. 71). In the present note reference is again made to these cases. It is pointed out that parasites were found in the skin of two of ten human cases examined. In one case the parasites were few in number, but in the other the infection was a heavy one. In both the parasites were present in widely separated portions of skin. The skin of one of the eight cases which were negative to microscopical examination produced infection after injection into a hamster.

9. **Erosion of the Inner Table of the Skull by Hyperplasia of Bone-Marrow in Kala-Azar, with Extra-Medullary Formation of Blood on the Surface of the Dura** [Hu (C. H.) & Cash (J. R.)].—pp. 80–86. With 8 figs. on 2 plates. [1 ref.]

Hu and Cash describe two cases in children with marked anaemia and leucopenia associated with unusually extensive and widely spread hyperplasia of the bone marrow. The first case was proved to be kala azar by the demonstration of parasites in the extra-medullary bone marrow. The second case was so similar that, though parasites were not demonstrated, there was little doubt as to the diagnosis. In both cases the hyperplasia of the bone marrow had led to erosion of the inner

table of the skull and extensive extra-medullary blood formation on the surface of the dura. Nucleated red blood corpuscles and myelocytes were not present in the blood, and their absence could only be accounted for by the assumption that such forms were unable to escape from the sites of their formation. In both cases the specific lesions of kala azar consisting of clasmatocytes were found only in the bone marrow of the skull and in that on the surface of the dura of the first case. The spleen, liver and lymph glands of both cases showed no changes characteristic of kala azar.

10. **Peripheral Lesions produced by *Leishmania donovani* and Allied Organisms** [YOUNG (Charles W.) & HERTIG (Marshall)].—pp. 87–88. [7 refs.]

Young and Hertig give an account of hamsters inoculated with *Leishmania donovani* and allied organisms. Cultures of *L. donovani* from dermal leishmanoid and the xanthoma-like lesions inoculated into hamsters intraperitoneally produced only visceral infections. Tunisian human and canine strains produced visceral infection followed by peripheral lesions. The same result followed the injection of *L. tarentolae* of the Tunisian gecko. Details of these experiments have already been published (this *Bulletin*, Vol. 25, p. 424).

11. **Diagnostic Value of the Antimony Test in Kala-Azar** [CHOPRA (R. N.), GUPTA (J. C.) & BASU (N. K.)].—pp. 89–97.

Chopra, Gupta and Basu describe the antimony test in kala azar and discuss its diagnostic value as compared with the aldehyde test (see paper by CHOPRA and DE reviewed below).

SORGE (Giuseppe). Leishmaniosi viscerale della seconda infanzia e della giovinezza. [**Kala Azar in Childhood and Adolescence.**]—*Riforma Med.* 1930. Jan. 27. Vol. 46. No. 4. pp. 129–130, 133–134. With 2 charts. [1 ref.] [Med. Clinic, Univ., Catania.]

A description of four cases of kala azar in peasants whose ages were 11, 17, 18 and 24. They were all seen during the first half of 1929 at the Clinic at Catania. Two of the cases were in a brother and sister who, living together, fell ill at the same time. Attention is drawn to the differences between the disease in adults and children, and to the greater difficulties of diagnosis and less immediate response to antimony treatment in the former.

C. M. W.

LOW (G. Carmichael). **An Interesting Case of Kala-Azar from the Point of View of Diagnosis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Nov. 25. Vol. 23. No. 3. pp. 305–308. With 1 chart. [Hosp. for Trop. Diseases, London.]

An Indian ship's cook fell ill on the journey to England and was admitted to hospital. There was no enlargement of the liver and spleen. The temperature remained up for a fortnight and then fell to near normal, where it remained for three weeks. The only indication was a strongly positive Wassermann reaction. A course of salvarsan injections was commenced. Two days later the temperature rose again and repeated rigors occurred. Finally liver abscess was suspected. The liver was

explored, but as no pus was discovered a smear was made. In this a scanty leishmania infection was found. Under treatment with stibamine glucoside all signs of the disease disappeared.

C. M. W.

OSTROWSKI (B.). Ueber einen Fall von Kala Azar. [**A Case of Kala Azar.**] —*Monatssch. f. Kinderheilk.* 1930. Mar. Vol. 46. No. 3. pp. 193–204. With 2 figs. & 1 curve. [10 refs.] [Children's Dept., Hadassah, Haifa.]

The paper describes in detail a case of kala azar in a boy seven years of age. The disease was contracted at Hadassa (Haifa) the case being the first to be recorded from Palestine. As treatment with antimosan did not control the temperature neostibosan was administered with good results.

C. M. W.

YATES (Theodore M.). **Treatment of Kala Azar with Report of 92 Cases from Hope Hospital, Anhwei, China.**—*China Med. Jl.* 1929. Nov. Vol. 43. No. 11. pp. 1053–1063. With 15 figs. on 5 plates.

The paper describes the treatment of 61 cases of kala azar with tartar emetic and 31 with stibosan or neostam. In the first series the mortality rate was 23 per cent., the deaths being due to pneumonia in winter, and dysentery in summer. The average stay in hospital was 91 days. The results obtained with stibosan and neostam were much better. The mortality rate was reduced to 10 per cent. and the stay in hospital to 47 days. In the tartar emetic series the duration of the disease before treatment was commenced was 12·7 months, while that of the second series was 18·6 months. No difference was found between the efficiency of stibosan and neostam. C. M. W.

COSTANTINO (Salvatore). Contributo alla conoscenza ed alla terapia del kala-azar. [**Treatment of Kala Azar at Palermo.**]—*Pediatria.* 1930. Apr. 15. Vol. 38. No. 8. pp. 433–440. [Inst. of Med. Path., Univ., Palermo.]

With a view to illustrating the good results obtained in infantile kala azar by intravenous injection of tartar emetic the author describes twelve cases treated by him in Carini, Palermo. It would appear that the disease has become more prevalent in Carini during the past few years. The ages of the children varied from 14 months to 3 years. The quantity of the drug employed varied from 29 centigrams to 1·8 gm. while the duration of treatment varied from 65 days to 4 months. One patient died of broncho-pneumonia after two months' treatment, while the others were cured. C. M. W.

BRAHMACHARI (Upendranath) & BANERJEA (Radhakrishna). **Studies in Kala-Azar and Chemotherapy of Antimony. I. Subsequent History of the First Recorded Case of Dermal Leishmanoid. II. Subsequent History of a Case of Dermal Leishmanoid originally considered to have been Refractory to Treatment.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Nov. 25. Vol. 23. No. 3. pp. 301–304. With 2 plates. [2 refs.] [Brahmachari Research Inst. Calcutta.]

The first case of dermal leishmanoid was described by the first of the two authors of the present paper in 1922 and again in 1923. The

patient remained under treatment for some time and disappeared without being cured. A relative gave the subsequent history. The depigmented patches increased in size while the nodules ulcerated. Subsequently the nodules diminished in size and healed. The patient died of dysentery about seven years after he was first seen.

The second case referred to had been treated without result at the Calcutta School of Tropical Medicine. When seen by the authors the patient had nodules on the face, trunk and extremities and in addition was found to be suffering from kala azar with fever, large spleen and positive flagellate culture from the blood. Leishmania were present in the nodules. Under treatment with urea stibamine the visceral infection was eradicated but the cutaneous condition persisted and developed into that of the typical dermal leishmanoid. Treatment with urea stibamine was continued and 9·3 gm. was given between September 13th, 1926, and August 29th, 1927. At the end of this period the patient was completely cured. When examined eight months later there was no sign of kala azar or of the dermal leishmanoid.

C. M. W.

i. Brahmachari (Upendranath) in collaboration with Gupta (Jnanendra Mohan Das), Banerjea (Radhakrishna) & Basu (Barendranath). **Studies in Kala-Azar and Chemotherapy of Antimony. Part II. The Treatment of Kala-Azar with Intramuscular Injection of Sodium N-Phenylglycineamide-4-Stibinate.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Apr. 17. Vol. 23. No. 6. pp. 617–622. With 3 charts. [7 refs.]

ii. —— in collaboration with Sen (Parimal Bikas) & Banerjea (Radhakrishna). **Part III. Observations on Antimony in the Spleen Cells of Animals infected with** *Leishmania donovani*.—*Ibid.* pp. 623–626. With 1 plate. [4 refs.]

i. The paper describes the use of sodium N-phenylglycineamide-4-stibinate, the antimony analogue of tryparsamide, in the treatment of kala azar. Used intravenously in doses of 0·05 to 0·2 gram satisfactory results were obtained in seven cases. Five cases were treated by intramuscular injections and similarly good results were obtained. The doses varied from 0·05 to 0·15 gram in three cases, from 0·1 to 0·3 gram in one and from 0·05 to 0·1 in another. It is pointed out that local irritation is frequently slight.

ii. By injecting finely divided antimony intravenously into leishmania-infected mice the authors have noted that it is deposited in the cells which harbour the parasites. In some of the cells the antimony is in a diffuse state which probably represents a stage in the conversion of the particles into colloidal particles before they pass into complete solution. The leishmania in some of the cells containing antimony had a degenerate appearance.

C. M. W.

Burowa (L. F.). Die Behandlung der visceralen Leischmaniose. [**Treatment of Kala Azar.**]—*Russian Jl. Trop. Med.* 1929. Vol. 7. No. 5. pp. 309–315. [8 refs.] [In Russian. German summary p. 315.]

During the course of two and a half years, the author has seen at the malaria clinic in Tashkent 50 cases of kala azar. Of 34 cases in which

treatment with tartar emetic or stibosan was completed, 29 recovered and 5 died. In 12 resistant cases with specially large spleens Röntgen ray therapy was also employed with, in the author's opinion, good results.

C. M. W.

SCHEWTSCHENKO (F. I.). Ein Fall glücklicher Behandlung der schweren Kinderleishmaniose. [**Treatment of Severe Infantile Kala Azar.**]—*Pensée Méd. d' Usbequistane et de Turqumenistane.* Tashkent. 1929. Nov.–Dec. No. 2/3. pp. 11–15. With 3 figs. [In Russian. German summary p. 146.]

A child with kala azar was treated for two years with antimony preparations without being cured. Finally the spleen was exposed to the action of Röntgen rays while stibosan was administered. Improvement was immediate and cure resulted in six months after 80 injections of stibosan and 13 exposures to Röntgen rays had been given.

C. M. W.

PANAYOTATOU (Angélique). **Infantile Kala-azar; a Case cured at Alexandria by a New Method.**—*Brit. Jl. Children's Diseases.* 1929. Apr.-June. Vol. 26. Nos. 304–306. pp. 112–115. [4 refs.]

The case reported is that of a native boy 2½ years of age and the method of treatment was the administration of tartar emetic per rectum. The first dose was 4 cc. of a 0·25 per cent. solution of the drug and this was repeated on alternate days till five doses had been given. As there were then definite signs of improvement the dose was increased to 6 cc. and after four injections had been given the child's condition was obviously better. The dose was increased to 8 cc. and then to 10 cc. The spleen had then become almost impalpable, the fever had entirely subsided, the abdomen was soft and the venous network had disappeared. The child was bright and cheerful, the appetite was returning and the weight was increasing. The mother, who considered that a cure had been effected, did not bring the child till after twelve days had elapsed. On this occasion and seven days later 10 cc. were administered. In all 0·05 grams of tartar emetic were given in the manner indicated. Four months later the child was in good health.

This is the fourth case to be recorded from Alexandria, three others having been reported by the author in 1922 (this *Bulletin*, Vol. 20, p. 568). Attention is drawn to the fact that from the point of view of the distribution of kala azar and oriental sore Alexandria is of interest, in that both diseases occur there, though as a rule in different localities.

C. M. W.

KEEFER (Chester S.), KHAW (O. K.) & YANG (C. S.). **The Anemia of Kala-Azar, with Special Reference to Treatment.**—*Nat. Med. Jl. China.* 1929. Dec. Vol. 15. No. 6. pp. 731–742. With 5 charts in text. [3 refs.] [Peiping Union Med. College, Peking, China.]

The changes in the blood have been studied in 119 cases of kala azar. All the blood elements were reduced in the majority of patients. The characteristic changes are an anaemia of the aregeneratory type, leucopenia, and thrombocytopenia. These lead to symptoms of anaemia, predisposition to intercurrent infections and haemorrhagic

tendency. Nucleated red blood corpuscles have never been seen. In treating these patients the best form of therapy seems to be specific treatment, blood transfusion, treatment of intercurrent infections and general upbuilding with adequate diet supplemented with liver and iron.

C. M. W.

i. Chopra (R. N.) & De (N. N.). **The Significance of the Antimony Test in the Diagnosis of Kala-Azar. Part I—Serum Tests.**—*Indian Med. Gaz.* 1929. Dec. Vol. 64. No. 12. pp. 661–668. [11 refs.] [School of Trop. Med. & Hyg., Calcutta.]

ii. Napier (L. Everard). **Notes on "the Significance of the Antimony Test in the Diagnosis of Kala-Azar."**—*Ibid.* pp. 669–670. [2 refs.]

i. The authors have examined with considerable care the relative value of the aldehyde test and the antimony test for kala azar. The aldehyde test was carried out with undiluted serum and with serum diluted 1 in 10. Of 201 cases of kala azar, which had been diagnosed by the discovery of parasites, 156 gave a strongly positive reaction with the antimony test with undiluted serum, while with the diluted serum the number was 109. The aldehyde test was strongly positive in 128 cases. In testing unknown sera for kala azar a certain number of positives are obtained from cases of other diseases if undiluted sera are used. These incorrect results are eliminated if diluted serum is used, but a number of early cases of kala azar are missed. The best result is obtained by carrying out the antimony test with both diluted and undiluted sera. It is very important that the tubes used should be scrupulously clean and that the water employed for diluting the sera and for dissolving the urea stibamine should be doubly distilled. Traces of salts may introduce errors. Small tubes with internal diameter of 4 to 5 mm. were found to be satisfactory. The serum is transferred to these tubes by means of a perfectly clean pipette, care being taken to avoid air bubbles. The precipitate with undiluted serum in strongly positive cases forms immediately, is thick and shows coarse flocculation. It conglomerates into a thick coagulated mass. With diluted serum the precipitate is smaller in amount, but has a coarsely flocculent character. The optimum time for reading the result is 5 to 10 minutes after addition of the antimony.

ii. Commenting on the results obtained by the authors of the first paper, Napier from an examination of the figures finds that the aldehyde test and the antimony test with diluted sera are of almost equal and of very considerable value in the diagnosis of kala azar, but that the antimony test with undiluted serum falls short of both of these.

C. M. W.

Napier (L. Everard) & Sen (G. N.). **An Investigation to decide the Most Suitable Dilutions for the Performance of the Antimony Test for Kala-Azar.**—*Indian Jl. Med. Res.* 1930. Apr. Vol. 17. No. 4. pp. 1139–1151. [School of Trop. Med. & Hyg., Calcutta.]

In the performance of the antimony test for kala azar various dilutions of the urea stibamine solution and the serum have been employed without any very clear idea as to which are the best. With the object of determining the optimum dilutions a series of careful tests

has been carried out by the authors with the result that they find that the test was most satisfactory when a 25 per cent. dilution of the serum was added to 4, 2, 1, or 0·5 per cent. solution of urea stibamine. In practice the test can be readily carried out by adding 2 drops (0·125 cc.) of serum to 1 cc. of a 0·5 per cent. solution of urea stibamine. This method is suggested for the clinical application of the test.

C. M. W.

Shortt (H. E.), Craighead (A. C.), Smith (R. O. A.), d'Silva (H. A. H.) & Das (Sribas). **The Diagnosis of Kala-Azar by the Urea Stibamine Test.**—*Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 907–911. [1 ref.]

The authors have investigated the reliability of the antimony test for kala azar. In 81·3 per cent. of 476 tests there was agreement with the protozoological findings. In 144 positive tests the diagnosis of kala azar would have been erroneous in 65 instances. Similarly of 314 negative tests there would have been error in 8 instances for parasites were present on these occasions. It is concluded that the test is of more value for excluding than in revealing kala azar.

C. M. W.

Chopra (R. N.) & Mukherjee (B. P.). **The Value of the Antimony Test in the Diagnosis of Kala-Azar. Part II. The Finger Prick Blood Test.**—*Indian Med. Gaz.* 1930. Apr. Vol. 65. No. 4. pp. 203–206. [4 refs.] [School of Trop. Med., Calcutta.]

In 1927 a technique for carrying out the antimony test for kala azar with blood obtained by pricking the finger was described (this *Bulletin*, Vol. 25, p. 68). The technique has been modified. A drop of blood from the pricked finger is received in a small test tube (⅜ inch internal diameter and 2 inches in length) containing 0·25 cc. of a 2 per cent. solution of potassium oxalate. The drop can easily be secured by pressing the mouth of the tube against the finger and inverting the tube. After mixing the blood with the solution the tube is allowed to stand for 10 to 15 minutes when the supernatant fluid can be pipetted off to a small tube 4 to 5 mm. in diameter and 2 inches long. A 4 per cent. solution of urea stibamine is then allowed to run along the side of the tube. In positive cases a flocculent precipitate appears slowly in the whole column of the fluid. The reading should be made in 5 to 10 minutes. In 124 definite cases of kala azar a positive reaction was obtained in 80·7 per cent. In 78 non-kala azar cases 11·5 per cent. gave a positive reading. The test is extremely simple and is a good rough test for the diagnosis of kala azar. It is a bed-side procedure in which the difficulties of vein puncture are avoided.

C. M. W.

Fiorentino (Angela). Contributo allo studio dell'importanza della stibosansieroreazione nella diagnosi della leishmaniosi interna infantile. [**The Stibosan Serum Reaction in the Diagnosis of Infantile Kala Azar.**]—*Pediatria.* 1930. Feb. 1. Vol. 38. No. 3. pp. 137–146. [12 refs.] [Inst. of Clin. Pediatrics, Univ., Catania.]

The author has tested the value of the antimony test in kala azar in 159 cases of infantile kala azar and 184 children who were either

healthy or suffering from some other disease. The tests were carried out with a freshly prepared 1 per cent. solution of stibosan. The conclusion reached is that though the reaction cannot be considered specific for kala azar a positive reaction when the symptoms are indictive of kala azar is strongly in favour of a diagnosis of this disease.

C. M. W.

CERZA (Luigi). Su di una reazione di precipitazione per la diagnosi del kala-azar. [**A Precipitation Reaction in the Diagnosis of Kala Azar.**]—*Pediatria.* 1930. Apr. 1. Vol. 38. No. 7. pp. 394–400. [6 refs.] [Inst. of Clin. Pediatrics, Univ., Naples.]

In 1924 SIA (this *Bulletin*, Vol. 22, p. 201) described a method for the quantitative estimation of the globulin precipitate which is formed when 20 cc. of kala azar blood are mixed with 0·6 cc. of distilled water. It was claimed that the reaction could be graded as strongly, moderately or weakly positive, and that the progress of a case of kala azar undergoing treatment could be followed. The present author has investigated the question in 32 children suffering from kala azar, 12 healthy children and 18 suffering from other diseases. He has found that the reaction is usually, though not invariably, positive in cases of kala azar. Its general tendency is to become less markedly positive and finally negative during the course of successful treatment. In other diseases, however, a positive reaction may occur so that for the actual diagnosis of kala azar the finding of the parasite is the only reliable method. The reaction is too irregular for the quantitative estimation of the globulin to be of value as an indication of the stage or progress of the disease.

C. M. W.

ANDRÉ (Z.) & LABERNADIE (V.). Utilisation du photomètre Vernes-Bricq-Yvon pour éviter certaines causes d'erreur dans le diagnostic du kala-azar par la réaction de précipitation de Chopra et Gupta. [**Use of a Photometer in Chopra and Gupta's Precipitation Reaction.**]—*Bull. Soc. Path. Exot.* 1930. Jan. 8. Vol. 23. No. 1. pp. 29–30. [2 refs.] [Colonial Hosp., Pondicherry.]

In the antimony test for kala azar as described by CHOPRA and GUPTA the serum of the patient is distributed in three tubes the first of which contains undiluted serum, the second serum diluted 1 in 5 and the third serum diluted 1 in 10. To each tube are added one or two drops of a 4 per cent. solution of urea stibamine. The precipitate occurs in decreasing intensity in the three tubes, but from the point of view of diagnosis it is its presence in the third tube which is of importance. The authors note that a precipitate may occur in the third tube in the case of the serum of patients who have been treated with quinine. To obviate this difficulty they have tested the opacity of the liquids by means of a photometer and have found that changes in opacity can be detected with much higher dilutions. In the case of kala azar sera diluted to 1 in 1,000 an increase in opacity greater than 15 occurs, whereas in other conditions, as for instance in quinine treated cases, the increase is not over 5.

C. M. W.

LING (Schmorl M.). **Distribution of Protein Fractions in the Serum of Kala-Azar Patients.**—*Proc. Soc. Experim. Biol. & Med.* 1930. Jan. Vol. 27. No. 4. pp. 247–249. [6 refs.] [Peiping Union Med. College, Peking, China.]

Ray's haemolytic test for kala azar is positive when blood haemolysde with distilled water instead of remaining clear forms a flocculent precipitate. SIA and WU showed that the precipitate was due to serum globulin which is increased in kala azar. The author finds that there is an increase of euglobulin to a quantity which is three to thirteen times the normal and an increase of pseudoglobulin once to nearly twice, and sometimes more than twice, the normal. The precipitate which forms in Ray's test may be considered as due to the increase in euglobulin, or some special euglobulin. C. M. W.

MAYER (Martin). Neuere Ergebnisse von Kultur- und Tierversuchen mit Leishmanien. [**Recent Cultural and Animal Experiments with Leishmania.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 94–97 (178–181). With 2 text figs.

In a previous paper (this *Bulletin*, Vol. 25, p. 859) the author with RAY stated that *Leishmania tropica, L. donovani* and the parasite of S. American leishmaniasis could be differentiated by the character of the growth on blood agar plates. The results were thought by some to be due to the varying age of the culture strains employed. Further observations have convinced the author that this criticism is unsound for the same differences have been noted with recently isolated strains. The European hamster is readily infected even with old cultures of *L. donovani*. The disease ends fatally in weeks or months with heavy infection of all the inner organs. As noted by CASH and HU, heavy skin infections also occur. Intracutaneous inoculation of *L. donovani* as of *L. tropica* produces a local reaction which on the abdomen takes the form of a black pigmentation. Under the epidermis parasites can be found in large numbers. The pigmentation is due to the new formation of closely packed hair follicles in the sub-cutaneous fat. Local inoculations of *L. tropica* in the ear, nose and root of the tail brought about swellings, without ulceration, in which leishmania were demonstrable after several months. A South American strain was very slightly pathogenic, but one from Palestine was very markedly so. It produced lesions in one animal not only at the site of inoculation. The eyes were involved in ulcers and oedema, the ears ulcerated and the four feet showed marked swelling. Scanty parasites were found in the spleen, liver and lungs. Another animal inoculated at the same time at the root of the tail developed an ulcer at the site of inoculation and on death revealed numerous parasites in the bone marrow and a few in the liver and lungs. Intraperitoneal inoculation of the same strain produced a generalized infection with few parasites. C. M. W.

HOEPPLI (R.). Neuere pathologische Befunde bei experimenteller Trypanosomiasis und Leishmaniasis. [**Pathological Findings in Experimental Leishmaniasis.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 101–112 (185–196). With 4 text figs. [7 refs.]

The author has made a histological study of European hamsters infected with *Leishmania donovani* and *L. tropica*. His results are in

complete agreement with those of MELENEY who studied infections in Chinese hamsters (this *Bulletin*, Vol. 22, p. 683). Two hamsters inoculated with *L. donovani* developed lesions of the skin at the site of inoculation. They showed small groups of macrophages occupying the spaces between the bundles of connective tissue fibres and thus differing from the lesions produced by *L. tropica* which give the impression of a new tissue rich in macrophages and capillaries which pushes aside the unchanged normal tissues. In two hamsters inoculated with *L. tropica* a generalized infection occurred and in one of these were inflammatory foci in the myocardium, where what appeared to be flagellated leptomonad forms of the parasite occurred.

C. M. W.

DE CAPUA (F.). Alterazioni del sistema reticolo-istiocitario nella leishmaniosi infantile. II. I monociti nel sangue periferico dei bambini leishmaniotici. [**Changes in the R.E. System in Infantile Kala Azar.**]—*Pediatria.* 1929. Nov. 15. Vol. 37. No. 22. pp. 1223–1234. [12 refs.] [Inst. of Clin. Pediatrics, Univ., Naples.]

Examination of the blood of forty cases of infantile kala azar revealed a constant monocytosis which varied in intensity with the duration of the disease. Eosinophiles and basophiles were very scarce, while normoblasts were not present in any numbers. In all the cases there were present endothelial cells which could be described as monocytoid endothelial cells. The percentage varied from 4·2 to 5·5. In no case were leishmania found in them. The monocytosis and particularly the presence of the cells of the endothelial type confirm the view that in kala azar there is a parasitic blocking of the reticulo-endothelial system.

C. M. W.

YANG (C. S.) & CH'EN (K. T.). **The Blood Platelets in Kala-Azar.**—*Nat. Med. Jl. China.* 1930. Feb. Vol. 16. No. 1. pp. 34–42. With 7 charts in text. [Union Med. College, Peking.]

The fact that one of the outstanding features of kala azar is a haemorrhagic tendency has led to an investigation of the blood platelets. It has been found that the disease is associated with a thrombocytopenia in which the platelets vary from 50,000 to 100,000 per cubic millimeter. Bleeding from the mucous membranes usually occurs when the lower level is reached. Intercurrent infections bring about either a thrombocytosis or a further depression of the platelets. Treatment with urea stibamine causes a further decrease in the number of platelets and this is maintained as long as treatment lasts. During recovery the platelets increase in number.

C. M. W.

LLOYD (R. B.), NAPIER (L. Everard) & MITRA (G. C.). **The Wassermann Reaction in Kala-Azar.** *Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 957–959. [3 refs.]

The authors review the records of the examination of the Wassermann reaction in cases of kala azar and give their findings in a series of 474 cases of the disease. The percentage of these cases giving a positive reaction is 22, but this rate is no higher than the estimated syphilis rate of the controls. The first of the authors in 1921 examined a series of

101 cases and obtained a percentage of positives of 29, which is somewhat higher than the percentage ordinarily yielded by control series. It is concluded that kala azar is not a cause of a positive Wassermann reaction and that though syphilis may possibly predispose to kala azar infection there is actually little evidence of this.

C. M. W.

Ray (Jyotis Chandra). Serologische Untersuchungen bei Leishmanien. [**Serological Researches with Leishmania.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Nov. Vol. 33. No. 11. pp. 598–602. [12 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Immune sera were produced by inoculation of rabbits with large quantities of pure culture forms of *Leishmania donovani*, *L. tropica* and *L. tropica* var. *americana*. The sera readily agglutinated the culture forms but in most cases were not specific so that separation of the parasites was not possible. It is suggested that the magnitude of the doses given the rabbits may be responsible for this loss of specificity. An attempt at complement fixation did not give satisfactory results.

C. M. W.

Mills (E. A.) & Machattie (C.). in collaboration with Chadwick (C. R.). **A Preliminary Note on the Relationship of the Parasites of Human and Canine Dermal Leishmaniasis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Jan. 30. Vol. 23. No. 4. pp. 413–416. With 2 plates. [3 refs.]

Discussing the relationship of human and canine oriental sore in Baghdad the authors point out that there are definite areas in which the human disease is common and others in which it is rare. The canine cases are similarly common or rare in the same areas. In the British Cantonment of Alwiyah there is only one recorded human case and only one canine case, both from the same house. In Baghdad North there is a small British settlement and there two human cases and two canine cases have occurred, both in the same household at the same period of the year. Both in human beings and in dogs the early lesions begin to make their appearance in September. As the disease in dogs is of much shorter duration than in human beings the seasonal incidence of the canine oriental sore is well marked, very few cases being seen in late summer. It has been shown that *Leishmania tropica* from human cases will infect both *Phlebotomus papatasii* and *P. sergenti* and the authors have shown this to be true of the dog strain also. By growing the human and canine strains in Noguchi's leptospira medium with or without the addition of human or canine immune sera, it has been shown that they are very closely related, if not identical.

C. M. W.

Chodukin (N. I.). [**Fundamental Problems of the Epidemiology of Kala Azar in Relation to the Epidemiology of Canine Leishmaniasis in Middle Asia.**]—*Supplement to Pensée Méd. d' Usbequistane et de Turqumenistane.* Tashkent. 1928–29. 146 pp. With 11 plates & 16 text figs. [150 refs.] [In Russian.]

In this work an attempt is made to verify Basile's observations in Italy regarding the correlation between human and canine leishmaniasis. The investigation was conducted in Tashkent, Turkestan, since 1925,

and was based upon an epidemiological study of the disease on the one hand, and upon the biological properties of the parasites on the other.

The incidence of kala azar in Tashkent is relatively low, the average number of cases per annum during the years 1924–1926 being 24 (0·01 per cent. of the population). The numbers of children (up to the age of 16) affected in 1926 was 28 (0·09 per cent.) out of a total of 39,369. The age incidence tends to be of the Indian type. The central part of the town is mainly affected, while in the outskirts the incidence is relatively low. In the affected districts kala azar cases are sometimes restricted to separate dwellings where they persist for a number of years.

With a view to determining the degree of contact between man and dog a census of dogs was undertaken. In 1926 the total number of dogs in Tashkent was 7,313, of which 49 (0·67 per cent.) were suffering from visceral leishmaniasis; in 1927 there were 10,724 dogs, of which 14 (0·02 per cent.) were infected. The proportion of dogs living in houses, in close contact with man, was greater in the more affected central districts of the town than in the free or slightly affected outskirts, where the majority of dogs lead an out-door existence. It was established that the central districts also represented active foci of infantile leishmaniasis. In a number of instances actual contact between kala azar cases and diseased dogs could be traced; out of 43 human cases, 33 were known to have been in contact with dogs, 16 having been in contact with known infected dogs.

In 1926 a large number of infected and healthy dogs were destroyed in Tashkent. The diminution in the number of dogs in contact with man resulted in a decrease in the number of children affected with kala azar in 1927, the number of cases being $3\frac{1}{2}$ times less than in the preceding year. In other towns in which no measures were undertaken against dogs the incidence of kala azar remained unchanged.

The author believes that leishmaniasis is spread in Tashkent through the medium of dogs. It was repeatedly observed that the appearance of infected dogs in different districts of the town was succeeded by cases of kala azar in children, but sometimes the reverse was noted. The epidemiological observations on human and canine leishmaniasis, according to the author, serve to support the contention that the causative organisms are identical.

The biological relationship of the different types of Leishmania was studied by means of the adhesion reaction (Rieckenberg's phenomenon), Noguchi's phenomenon and by agglutination. Eleven strains comprising *L. donovani*, *L. tropica* and the corresponding canine varieties were studied.

Using mice immunized with the four varieties of leishmania for the adhesion reaction it was found in cross tests with these flagellates that they all gave positive results, thus confirming their close affinity. In Noguchi's reaction, the serum of rabbits immunized against the organisms of canine visceral leishmaniasis had an agglomerating and parasiticidal action upon *L. donovani* and the canine variety of *L. tropica*. A group reaction was obtained by using agglutination methods with the strains mentioned. The serological reactions, according to the author, point to the identity of the receptors in *L. donovani* and *L. canis*.

The paper contains an account of successful infection of *Phlebotomus papatasii* from cases of canine leishmaniasis. The flies used were

wild females. The percentage of infected flies was up to 14·2, with an average of 2·8. The flagellates were concentrated chiefly in the anterior region of the alimentary tract. Control flies caught in the same locality as those used for the experiments were negative. Two chapters are devoted to a description of the Turkestan sand flies and their bionomics. Two new forms—*P. selectus* n. sp., and *P. grekovi* n. sp.—are recorded.

C. A. Hoare.

Bogoiawlenski (N.). Leishmaniose viscérale humaine et leishmaniose des chiens dans le district de Kazakh en Azerbaidjan. [**Kala Azar of Man and Dog in the Kazakh District, Azerbaijan.**]—*Arch. Inst. Microbiol et Hyg. d'Azerbaidjan.* 1929. Vol. 1. No. 1–2. pp. 121–125. [5 refs.] [In Russian. French summary p. 155.]

In 1928 three cases of kala azar were diagnosed in the hospital at Baku. All three were from Azerbaijan. In 1929 seven cases were seen in children and two in dogs in Kazakh and one in a child in Ganja. It is evident that the human and canine disease is endemic in the district of Kazakh.

C. M. W.

Sofiev (M. S.) & Shevchenko (F. I.). **The Vitality of** *Leishmania canis* **in the Digestive Tract of** *Phlebotomus papatasii*(**Scop.**).—*Meditz. Muisl' Uzbekistana.* Tashkent. 1929. Feb. Vol. 8. No. 5. pp. 48–55. With 1 plate. French summary p. 100. [Summarized in *Rev. Applied Entom.* 1929. Dec. Vol. 17. Ser. B. Pt. 12. p. 252.]

The authors have fed *Phlebotomus papatasii* on the margins of leishmanial ulcers on the nose of two dogs, one of which had a visceral infection also. The sand flies were kept for 24 hours to eight days at a temperature of 21° to 28° C. After the third day they were fed on sugar and water. The percentages containing leishmania were ; first day 96, second day 69·2, third day 61·5, sixth day 2·7. On the seventh and eight days a rise in the percentage occurred, the figures being 4 and 4·05. Flagellate forms were first observed after 24 hours, the fully elongate ones on the third day.

C. M. W.

Karamchandani (P. V.). **Oriental Sore treated by Berberine Sulphate. An Analysis of Fifty Cases.**—*Lancet.* 1930. Jan. 11. p. 78. [1 ref.]

The author has treated fifty cases of oriental sore with berberine sulphate. The average period of cure was a little more than seventeen days, while the average number of injections was three. Treatment consists in injecting into the sore a solution of one third of a grain of the drug in one and a half cc. Injections are given at weekly intervals with freshly prepared solutions. It is advantageous to apply hypertonic or isotonic saline dressings. The further experience has led the author to modify the dosage recommended in an earlier paper (this *Bulletin,* Vol. 25, p. 74).

C. M. W.

Mühlens (P.). Ein hartnäckiger, anscheinend gegen Antimon resistenter Fall von Hautleishmaniose. [**A Refractory Case of Oriental Sore apparently Resistant to Antimony.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 79–83 (163–167). With 4 text figs.

A case of oriental sore with multiple lesions contracted in Western Asia was treated with intravenous injections of neostibosan, two injections of

neosalvarsan and local applications to the sores. As no improvement was noted injections of berberine sulphate into the lesions were instituted. During eight and a half weeks, 21 injections of a 1 per cent. solution were made into each of the larger lesions. Certain nodules which had appeared on the right forearm disappeared in three or four days as did all the other lesions except one on the left elbow and another on the back of the left hand, in which, however, leishmania could not be found when the patient was last seen.

C. M. W.

Sabbagh (Abdel-Kader). Deux cas de bouton d'Alep observés à Damas. [**Two Cases of Oriental Sore seen at Damascus.**]—*Bull. Soc. Path. Exot.* 1929. Nov. 13. Vol. 22. No. 9. pp. 774–776. [Milit. Hosp., Damascus.]

A record of two cases of oriental sore in Damascus. Though the disease has been suspected there, no previous records of infection acquired in that city appear to have been made.

C. M. W.

Buss (G.). Die amerikanische Hautleishmaniose. [**American Dermal Leishmaniasis.**]—*Arch. f. Dermat. u. Syph.* 1930. Mar. 22. Vol. 159. No. 3. pp. 555–579. With 12 text figs.

The paper gives a detailed account of the development and histology of the cutaneous, subcutaneous and lymphatic lesions of American leishmaniasis. The changes undergone by the tissues during the development of each type of lesion is traced and these bear a resemblance to the results following tuberculous or syphilitic infections. The author's remarks are illustrated by twelve microphotographs.

C. M. W.

Nicolas (J.) & Massia (G.). Sur une forme lupoïde du bouton d'Orient. [**A Lupoid Form of Oriental Sore.**]—*Bull. Soc. Française Dermat. et Syph.* 1930. Jan. Vol. 37. No. 1. pp. 54–56 (R. L. pp. 32–34).

The case described was that of a man who had two nodules on the face, which were taken to be lupoid in character and one of which was accordingly excised. Histological examination showed it to be due to leishmania which were present in enormous numbers.

C. M. W.

Vigne (Paul). Note sur le traitement du bouton d'Orient par le tréparsol et l'iodo-bismuthate de quinine. [**Treatment of Oriental Sore by Treparsol and Iodo-Bismuthate of Quinine.**]—*Bull. Soc. Française Dermat. et Syph.* 1930. Jan. Vol. 37. No. 1. pp. 50–54 (R.L. pp. 28–32). With 1 text fig.

Three cases of oriental sore were treated orally with treparsol in doses of 1 gm. on each of the first four days of the week. The drug is taken in the morning before food. One case was cured after four weeks' treatment and another in 17 days, while the third case did not respond so well. Two cases were treated with iodobismuthate of quinine administered intravenously in doses of 3 cc. twice a week. One

case was cured in 7½ and the other in 10 weeks. The author states that he adopts this second method for the routine treatment of cases of oriental sore.

C. M. W.

MITSUSE (B.). **A Report on a Case of Kala-Azar found in Fushun.**—*Jl. Oriental Med.* 1930. Mar. Vol. 12. No. 3. [In Japanese. English summary p. 29.] [Manchuria Med. College, Mukden.]

The case reported was in a Chinese boy twelve years of age. It is of interest in being the first case to be recorded from Manchuria.

C. M. W.

MALARIA.

BARBER (M. A.). **The History of Malaria in the United States.**—*Public Health Rep.* 1929. Oct. 25. Vol. 44. No. 43. pp. 2575–2587. [13 refs.]

It is a matter of common knowledge that malaria was once highly prevalent in the northern United States, and many people now living were its victims. Undoubtedly malaria got the blame for much illness that it did not cause, but, however much it may have been burdened with the belongings of other diseases, there was undoubtedly a large bulk of it at the bottom. Taking the evidence as a whole, the fact seems to be well established that malaria, once very prevalent in the Northern States, has almost disappeared from them, and that it has diminished in the Southern States. Several factors have been suggested as contributing to this decline, and it is evident that these factors are more or less co-operative ; as one rises or falls it tends to pull the others with it ; when people become more prosperous they are better fed, better housed, more resistant to disease, and more able to obtain abundant quinine and screening. Again, as the country is developed prosperity increases, drainage improves with agricultural development and mosquitoes are usually reduced in numbers. As an illustration of the influence of social conditions on the prevalence of malaria, the author mentions a letter which Dr. Henry CARTER wrote to him in 1925, telling him of the great increase which occurred in Virginia after Sheridan had been through the country at the end of the Civil War, and how the disease gradually disappeared as the country resumed its former condition, but that, a few years later, there was a fall in the price of the staple crop, which was wheat, and this led to economic depression, neglect of drainage, and considerable increase of malaria. Dr. CARTER thought that the abandonment of land, leading to poor drainage, was the most important factor in causing this increase. In the northern States the prevalence of malaria in the past was closely associated with pioneer life, and it decreased with the agricultural development of the country. There can be no doubt that anopheline intensity had much to do with the prevalence of the disease, but in some districts malaria has diminished without a reduction in the number of mosquitoes. In the prosperous rice fields of Louisiana it appears that malaria, which was once prevalent, has diminished and remains low in spite of the presence of large numbers of *A. quadrimaculatus*. The author examined 136 school children in a district sixty miles north of St. Louis, where malaria was once very plentiful, but not a single positive case was found though anopheles were abundant. Rice cultivation began in this district about five years before the examination was made, and it was followed by a great increase in the number of anopheles.

"This observation shows that *A. quadrimaculatus* may be produced abundantly in a northern region, and that an increase in *Anopheles* is not immediately followed by an increase in malaria. . . . In view of the fact that *Anopheles* are still present in large numbers in regions where malaria has disappeared or greatly decreased, it appears that a decrease in *Anopheles* was not an indispensable factor generally, however effective it may have been in some other regions. It is doubtful whether screening alone could explain the rapid decrease in malaria observed in some States."

In a certain rural locality malaria has increased rapidly during the past four or five years, although the percentage of screened houses is high—over 90 per cent. . . . Quinine is a factor hard to eliminate from the malaria equation in this country. . . . Osler in speaking of malaria in the districts about the western end of Lake Ontario and the northern shores of Lake Erie, states : ' The marshes are still there and the *Anopheles* are there, but the disease has gone. As in parts of Italy, the important factor appears to have been the cinchonizing of the inhabitants.' The cheapening of the drug may have . . . hastened the disappearance of malaria. . . . The experience of troops in southern Europe during the World War, however, has shown that quinine alone cannot prevent a serious prevalence . . . "An increase in the prosperity of the rural inhabitants of a malarious region has generally led to a decrease in malaria; but . . . the economic factor may include all of the others. In every region of high endemic malaria I have visited in this country, or any other, I have always found a considerable body of rural population poorly housed and inadequately treated. . . . We have no reliable data on the possible effect of domestic animals on the disappearance of malaria in the Northern States. . . . Nor have we any definite information as regards a possible diminution in the virulence of the malaria parasites. . . . It is pertinent to ask whether the regions of the United States once malarious but now free from this disease, have become malaria proof." New human carriers have come into the northern states from several sources, but, at the most, only minor epidemics of a transitory character have resulted. In the absence of some very profound social change, it would appear that the danger is not great, even in regions where anopheles still exist in considerable numbers. In the north, the decrease in malaria seems to have come about quite independently of any conscious effort on the part of health agencies. It had nearly disappeared by the time that the method of transmission of the disease by mosquitoes was discovered. . . . *It is probable that the diminution of malaria in the south, as in the north, was due to the development of the country.* . . . The history of malaria in this and other countries indicates that the disease may greatly diminish in spite of the presence of large numbers of anopheles, especially where social conditions have materially improved.

The author concludes: "The factors concerned in the diminution of malaria in the United States are inter-dependent ; their importance has varied with time and locality, but all have been closely related to the agricultural development of the country."

W. Fletcher.

James (S. P.). **The Disappearance of Malaria from England.**—*Proc. Roy. Soc. Med.* 1929. Nov. Vol. 23. No. 1. pp. 71–85 (Sect. Epidem. & State Med. pp. 1–15). With 5 text figs. [9 refs.]

In the first part of this paper, Col. James deals with the history of malaria in England. The term "ague," which is so largely used in old records, meant simply *acuta* (*febris acuta*) and was applied to many diseases such as typhus, typhoid, and relapsing fevers. True malaria has always been less prevalent than has been supposed, and it is doubtful if it ever spread far from the few localities near the sea coast which are now known to be its endemic foci in this country ; its distribution in 1860 was almost identical with its distribution during the last ten years. The affected areas are potentially not less malarious than they used to be, for when soldiers with malaria were invalided home to these districts, in 1916, a sharp epidemic followed with 235 cases. It is improbable that the malignant tertian parasite ever spread in England, for human infections seem to die out rapidly and Col. James has not

found it possible to transmit a strain to mosquitoes in this country. Malaria was certainly more prevalent and more severe in the past, but it is now kept in check by various factors which are continually in operation and except in circumstances such as occurred in 1916–1918, it has come to be of little importance, though the malarious character of the endemic areas has not been changed.

The second part of the paper deals with the various factors concerned with the maintenance and decline of the disease. Its decline is not due to a disappearance of *A. maculipennis*, the carrier ; these anopheles are more abundant in nearly every rural district than in many exceedingly malarious places in the tropics. The occurrence of malaria in England is not correlated with abundance of anopheles ; they are more numerous in some districts where it does not spread than in others where it does. The three species of English anopheles, *maculipennis*, *bifurcatus*, and *plumbeus*, can all be infected in the laboratory, but *maculipennis* is the only one which has been definitely incriminated ; this is because it is the only one which lives in close association with man. It is a domestic mosquito which lives and feeds in houses and cowsheds. It likes darkness, damp, and warmth ; this is why it is more plentiful in cowsheds than in human habitations, not because it prefers the blood of other animals to that of man as ROUBAUD has suggested. As infection in England occurs indoors, it is clear that the type of housing in malarious districts is all important.

Under natural conditions *maculipennis* must live at least fifteen days after feeding in order to become infective. Egg-laying ceases early in September, and there is then no reason for the mosquitoes to leave the house. (See SCHÜFFNER, KORTEWEG and SWELLENGREBEL, below, p. 648). It is also in September that the malarial infection of mosquitoes caught in houses, in northern Europe, begins to rise, and it increases remarkably in October and November. Col. James has found that few mosquitoes infected in the laboratory during the egg-laying season, live long enough to become infected, but when laying has ceased, a large proportion reaches the infective stage. The temperature out of doors does not limit the development of the parasites within the mosquito to the summer months, because *maculipennis* is a domestic mosquito and development can go on in a warm room, however cold it may be outside. Though mosquito infection occurs in the autumn, human infection, in northern Europe, occurs in the spring ; in the old days in England, malaria was always a phenomenon of the early months of the year. The key to this puzzle was supplied by Col. James's laboratory work which showed that in many patients who were intentionally infected with malaria by mosquito bites the disease remained latent for several months, and that the spring epidemic was due to infections transmitted by mosquito bites in the previous autumn. (See also above, p. 197). Epidemiological observations in so-called "malarious houses" show that the anopheles remain in the houses long enough to become infective and to infect the inmates. In these houses, if one member of the family happens to be a malaria carrier, cases continue to occur at intervals in that house for several weeks, but the disease does not spread to neighbouring houses. Such occurrences are limited to certain houses and certain types of people who live in them. In a cottage where a whole family sleeps in one room, malaria is likely to spread ; the incidence of malaria is always higher among the poor than among those who can afford to live in better houses. If malaria were not a house disease, this would not be so universally recorded.

Col. James has found that persons can be easily immunized against a strain of benign tertian, and this has happened in several isolated villages ; but the resistance is not proof against another strain, and the rise of malaria in endemic centres is generally due to the importation of new cases of the disease carrying new strains of the parasite. At present the disease is maintained chiefly by imported cases, but there is also an indigenous strain which has never entirely disappeared. When the imported cases are quickly discovered and treated with quinine the disease soon becomes negligible. The Kent epidemic of 1917 assumed large proportions because it was not diagnosed correctly, but as soon as it was recognized to be malaria it was very quickly stopped by quinine treatment. The introduction of cheap quinine was probably one of the most important factors in causing the observed reduction in the fatality and incidence of malaria in England.

Col. James concludes that the diminution of local malaria in England was due neither to natural causes nor to the intentional application of any particular preventive method reputed to be specific, but to progressive improvements of a social, economic, educational, medical and public health character. *A. maculipennis* is parasitic on man in proportion as human habits and mode of life are primitive and like those of the indigenous inhabitants of undeveloped countries where all the members of a family live huddled together in a cave, or in a windowless hut made of mud or straw. In England, particularly during the last seventy years, there have been great changes for the better in social and economic respects. Houses are better lighted and ventilated ; they are more open and less crowded and are much less liable to harbour anopheles. Other advantages accompany social and economic improvements ; roads are made ; scattered houses become easy of access ; doctors are available ; the people are not so indifferent to the advantages of health and comfort as more backward populations are ; they take pains to get proper medical attention and treatment with quinine. Malaria persists in England only in a few isolated rural areas which are notoriously backward in the common amenities of modern civilized life. In these localities wages are low, a whole family may live in one room of a dilapidated wooden shack, and no doctor is available for eight or ten miles. Proceeding from west to east across Europe this correlation between malaria and a low standard of living becomes very plain. " Malaria, like tuberculosis and syphilis, is a social disease."

Col. James adds : " *In order to prevent misunderstanding, I should like to add that my paper is not concerned at all with plans for dealing with malaria among particular groups of people who live in places or under conditions where accepted standards of living, and the medical and sanitary arrangements, make it practicable and desirable to supplement existing work by a direct attack aimed either at the insect host and carrier or at the parasite in man.*" Although this kind of work is of great local importance it has little to do with the problem among the bulk of the population of malarious countries, the poor, illiterate, underfed, indigenous peasantry whose dwellings are little better than those of primitive man. Among such people, malaria cannot be dealt with as an isolated problem; economic improvement is the object to which attention must first be directed. Agricultural schemes which aim primarily at improving the economic prosperity of the people, and are known as " bonifications," are of immense benefit to the indigenous population so that they become settled and well to do, and able and willing to assist in actively combating malaria and other diseases. The sources of malaria are not eradicated

by these schemes, but the people live in better houses, they are better fed, they are within reach of medical aid, and after a time the disease ceases to be of great importance as a cause of sickness and death.

W. F.

Cilento (R. W.) & Baldwin (A. H.). **Malaria in Australia.**—*Med. Jl. Australia.* 1930. Mar. 1. 17th Year. Vol. 1. No. 9. pp. 274–282. With 1 map in text. [43 refs. & bibliography.]

Malaria in Australia is, to-day, confined to a small area in the north-west, to two areas in the Northern Territory, and to two areas in north Queensland. In all these places, with the exception of the town of Cairns on the coast of Queensland, the infection is almost entirely limited to cattle-men, miners, sugar-cane labourers and aborigines. These are men who often live and work under very primitive conditions, with poor food and lodging. To the north and north-west of Australia, in the New Guinea archipelago and the great Melanesian arch is one of the most malarious regions in the world; north of 20° south latitude and west of 150° east longitude every area up to the equator is heavily infected with the exception of Australia. In the town of Cairns, endemic malaria probably depends on intercourse between infected natives from the islands and the population which lives in the over-crowded, swampy, and dirty native quarter of the town. Up to 1880, malaria was occasionally introduced into the country, but it failed to establish itself except around the Gulf of Carpentaria. The sparsity of the population is largely responsible for this fortunate freedom. During the period 1880 to 1890 there were temporary concentrations of population in connexion with mining, and malaria reached its height so far as its history in Australia is concerned. A similar increase of the disease has followed the discovery of payable minerals in subsequent years; the miners are attracted from malarious districts, living conditions are bad, and malaria spreads. A considerable change for the better occurred between 1891 and 1900, and it continued during the next decade when the Kanaka labour was repatriated; mining had become more stabilized and living conditions were better. During the last ten years, the deaths number only about 5 per million, and of 9,022 people examined in Western Australia, the Northern Territory, and south Queensland, only 44 had parasites in their blood. The distribution of *Anopheles annulipes* is general throughout the country and there have been large influxes of infected persons. Why is it, then, that malaria has become established in only a few small areas, and why does it not flourish even in these? It is true that, in Australia, there is no suitable native population to act as a reservoir, and the aborigines have little contact with the Europeans; the population, too, is very scanty in the malarious area, but on several occasions malaria has spread where sanitation was poor and work was heavy. The authors find the answer in the high standard of living enjoyed by most workers in the tropical and sub-tropical districts; they conclude that "the all-important factor is the economic and hygienic status of the people," which they believe will "safeguard Australia from a menace which has crippled many another country."

W. F.

WATSON (Malcolm). **Twenty-Five Years of Malaria Control in the Malay Peninsula—1901-1926. Malaya's Pioneer Work: the Development of "Species Sanitation," Subsoil Drainage, and Non-Poisonous Oiling: America Studies Malayan Methods: the Future of Biological Control: Some Malayan Pioneers.**—*Jl. Trop. Med. & Hyg.* 1929. Dec. 2. Vol. 32. No. 23. pp. 337–340.

Ronald Ross's discovery was at first looked upon as valueless though interesting. "The honour of being the first country in the Empire, and perhaps in the world, to use it successfully belongs to the Government of the Federated Malay States. Malaria control by drainage was begun in 1901, and before long the towns of Klang and Port Swettenham were completely freed from the disease." Though the swampy coastal districts were easily dealt with, great difficulties were encountered in the hills where malaria was carried by anopheles which bred in fast-running streams. After a temporary check, these difficulties were overcome by subsoil drainage, by oiling with a mixture of crude oil and kerosene, and by the preservation of jungle in ravines. The secret of success was "species sanitation," or the policy of striking only at the dangerous species of anopheles. "Then as a river restrained rises and bursts its barriers, our advance swept on with ever-increasing width and power. From hundreds of square miles in Malaya malaria has been driven; tens of thousands of lives have been saved; an incalculable amount of sickness, poverty and misery averted." The author expresses his surprise that, in view of the well-known successes achieved in Havana and Panama, the southern states of the U.S.A. were twenty years behind the Federated Malay States in beginning mosquito control.

W. F.

WALKER (J. H. C.). **Anti-Malaria Measures in Malaya.**—*Jl. Roy. Army Med. Corps.* 1930. Feb. Vol. 54. No. 2. pp. 87–106. With 14 text figs. [5 refs.]

The first part of this paper deals with the history of malaria in the Malay States and Singapore, and is largely compiled from WATSON'S "Prevention of Malaria in the Federated Malay States." [Major Walker is not quite correct in stating that the European area of Kuala Lumpur was freed from malaria in 1913 and has remained so ever since. Occasional outbreaks in the places which were highly malarious before they were drained show that the disease has been scotched but not killed, and are a reminder that constant watchfulness is necessary.] Figures are given showing that malaria, which was always present before the war among the troops stationed in the Singapore barracks, has been banished by anti-malaria drainage. There have been no cases since 1925. The author points out that "species sanitation" is the key-note of anti-malaria measures in Malaya, and that, as WATSON has shown, the three carriers of the country, *A. ludlowi*, *A. umbrosus* and *A. maculatus*, occur in three more or less distinct zones, in each of which a different method of control is required. (1) *A. ludlowi* breeds in the mangrove swamps; in the virgin state *A. umbrosus* is found in this zone, but if for any reason the jungle is cleared *A. ludlowi* makes its appearance. The most satisfactory measures are clearing and felling, or completely shutting out the sea by means of bunds, with open drains and sluice-gates. (2) *A. umbrosus* flourishes in the jungle of the coastal

plains, and is dealt with by clearing and putting in clean earth-drains, or by removing the cooly-lines at least half-a-mile from the jungle. After clearing, ravines are drained with sub-soil drains to prevent invasion by *A. maculatus*. (3) *A. maculatus* is the carrier of the central, hilly, inland zone, where it flourishes in clean, running water to which sunlight has access ; even the smallest seepage may be responsible for outbreaks of malaria. It does not breed in streams shaded by jungle, and it is now a well-recognised rule not to disturb the jungle unless anti-malaria measures can be undertaken. This mosquito is dealt with by controlling all surface water in sub-soil drains or concrete surface channels. Diagrams and photographs are given showing the kinds of drains and drainage employed in different parts of the country. There is also a photograph of a herring-bone system of concrete drains at Lymeun Fort in Hong Kong, which is given as an example of the futility and danger of attempting anti-malaria drainage without proper knowledge. These drains held back the surface water and *A. maculatus* was found breeding all over the drained area and in the drains themselves.

W. F.

James (S. P.). **Report on a Visit to Kenya and Uganda to advise on Antimalarial Measures.**—48 pp. 1929. Crown Agents for the Colonies, 4, Millbank, London, S.W. [1s.]

Col. James spent the greater part of his visit to Kenya working in two or three selected areas with the Director of the laboratory, Dr. Kauntze, and the Senior Entomologist, Mr. Simes. Field observation stations were established at Kitale and Taveta. This course appeared more useful to him than a hurried survey of wider extent, and it provided an example of the kind of work which was needed in the country. The conditions : (1) in towns ; (2) on railways and public works ; (3) on the farms of European settlers ; and (4) among the scattered indigenous population, are so different that they were studied separately.

(1) *Towns.* As regards the towns, Col. James agrees with the policy of freeing them from malaria by operations of drainage, filling, and other methods designed to prevent the breeding of anopheles, and an expert anti-malarial engineer, Mr. H. Bennett, has been seconded from the Malay States for work in Nairobi, Kitale and Eldoret. There are many difficulties to be overcome ; the site of Nairobi was badly chosen, its streets were badly planned, its sanitation is a menace, its population includes nearly 30,000 Africans and Asiatics who live under appalling conditions, and there is no machinery for the collection of vital statistics. Col. James considers that something more than major drainage schemes is required, and he recommends the appointment of a medical officer under the Municipality who would devote his whole time and attention to enquiring into the source of new cases of malaria, and to perfecting the details of anti-larval and other anti-mosquito measures adequately supported by anti-mosquito legislation. It is suggested that malaria should be made a notifiable disease, and that blood-films should be examined without charge at the government laboratory. Col. James is convinced that in the towns of Kenya malaria is a household disease in which the native servants, housed on the premises, are the usual source of infection, and that it could be dealt with most successfully by the householders themselves, acting under the advice of the malaria officer.

(2) *Public Works.* With reference to the railways, Col. James considers that the proposals made by their medical officer, Dr. K. WALLINGTON, would do much to improve them. He recommends that the railway authorities should themselves build hotels, at important junctions, which can be properly protected against mosquitoes and that, in the smaller places, the waiting rooms should be carefully screened.

(3) *Farms.* The prevention of malaria on the farms of settlers is considered to be a matter for the settler himself, aided by medical advice. The "Malaria Survey of Kenya," to which reference is made later, should draw up a definite plan for each farm and make periodical inspections. "The siting of houses for Europeans is, of course, by far the most important matter to be considered in connexion with the prevention of malaria among them." The houses of the settlers are generally built near streams, where the cattle and labourers tread down the banks and make a swamp in which mosquitoes breed. The stream should be trained and regularized, its banks kept smooth, and the formation of swamps prevented. If mosquitoes continued to breed freely in spite of these precautions, Paris green or oil should be used. The house-boys, with their wives and children, should not live nearer than 200 yards; the kitchen should be inside the house where it can be inspected frequently. Farm labour should be housed not less than 400 yards away, and no squatters should be permitted within half a mile. It is as important to prevent mosquitoes conveying the infection from the native labourers as it is to prevent mosquitoes breeding. The curative treatment of house-boys and labourers with quinine promises to be an important aid in preventing the spread of malaria. "Next to site and surroundings," says Col. James, "the type of house is most important." He recommends a wide verandah all round the house so that it can be effectively screened with 14 mesh No. 30 Imperial Standard wire gauze. In order that the house should afford as little shelter as possible to mosquitoes, ceilings should be provided for all rooms, and the walls should be colour-washed a light colour; every bed should have a rectangular mosquito net hung inside the framework. Until a properly screened house is available, a new settler should not be accompanied by his wife and children. It is important that the farms selected for receiving pupils should be in healthy districts.

(4) *The Indigenous population.* Malaria among the scattered natives is an entirely different problem. *In towns, on public works and on farms, "present knowledge enables and requires us to deal with the disease and its insect carrier by direct measures;"* but this only concerns some hundred thousand of the population of Kenya, and leaves untouched the problem of malaria prevention among the 2½ million naked, semi-nomadic, natives, who are almost without the necessities of life and are distributed over 200,000 square miles of country. The index of endemicity among them is very high and they constitute the source of malaria which spreads to the non-immune Europeans and Asiatics. It is not practicable to apply the expensive and difficult direct anti-mosquito measures, which are suitable for towns, to the vast area over which the indigenous peasantry is scattered. "Among them malaria cannot be dealt with satisfactorily as a matter separate from other medical and public health problems." The low economic status of the people must be raised. They themselves are more concerned about their material prosperity than about their health and it appears unreasonable to expect them to make better sanitary arrangements when they have only the bare necessities of life. Col. James did not think that the contention

that if they would take the initiative by doing what was advised about their health, they would become stronger and able to work harder and be able to earn more money struck them as an attractive appeal. It seems that the best way to gain their interest and co-operation is by a scheme which will increase their material possessions as well as their health, and that a plan is needed which will enable them to develop their lands and improve their standard of living—bonification, in short. Col. James suggests that a definite agricultural scheme should be drawn up for them in one of the reserves ; and that it should include a system of irrigation, by which a large area of land will be made to yield a profitable return. Lack of water is the fundamental difficulty in the reserves. When the natives become settled and prosperous, they will be able and willing, he thinks, to assist in actively combating malaria, tuberculosis, syphilis, and other social diseases. "The sources of malaria are not eradicated by these schemes, but as people live in better houses, have more and better food, and are within easy reach of medical aid, they are not infected so frequently, and the disease, when it occurs, is quickly and effectively treated and overcome."

He recommends the setting up of a new organization, The Malaria Survey of Kenya, consisting of a group of special workers to study malaria in all its aspects. It would comprise : two medical officers ; one medical entomologist ; one anti-malarial engineer ; one European laboratory assistant ; one entomological assistant, and an adequate number of African subordinates. The medical officers would have a year's training in the malaria laboratories of either the Ministry of Health in England or of the Tropical Diseases Institute at Amsterdam, and at the Central Bureau and Field Observation Stations of the Malaria Survey of India. If they had not taken the D.P.H., they should also undergo a course of training at the London School of Hygiene. Col. James also proposes the inauguration of an East African Research Fund (analogous to the Indian Research Fund), to which he suggests that the Governments of Kenya, Uganda, and Tanganyika should contribute.

Uganda.—Col. James made two tours in Uganda. All the places which he visited in the eastern provinces were so malarious that the disease among the indigenous inhabitants was chiefly a disease of children under five years of age ; most of those who were older than this had acquired immunity. He visited Kampala with Mr. H. BENNETT, the expert anti-malaria engineer from Malaya. The town is built on a series of hills, with swampy gullies between them in which there are brickfields, native vegetable gardens, wells, and borrow-pits. The incidence of malaria is very high ; its carriers are *A. costalis* and *A. funestus*, and a large proportion of those caught in tents were found to be infected (zygote infection 10 per cent. ; sporozoite infection 4·3 per cent.). The total area of the gullies is about 500 acres, and Mr. Bennett estimated the cost of their subsoil drainage at £15,000, with an annual charge of £600 for maintenance. Both he and Col. James recommend that, instead of putting in these drains, the gullies should be planted with eucalyptus trees ; the Forest Department has already dealt with a swamp near Kampala in this way and the results have been excellent. The cost would be only about a sixth of the cost of subsoil drainage, there would be no charge for upkeep after the first five years, and, later on, the plantations would bring in revenue. Col. James suggests that the value of afforestation with eucalyptus should be one of the subjects of enquiry for a local malaria survey unit. He recommends

that this organization should consist of a medical malaria officer, a medical entomologist and assistants, who should, later on, form the nucleus of a " Central Malaria Survey Unit." This would constitute a malaria section of the research laboratory Entebbe, where it would investigate the epidemiology of malaria in Uganda as a whole.

W. F.

WATSON (Malcolm); GILL (C. A.); ROSS (R.); CLARKE (Tertius); KING (W. G.); WHITE (R. Senior). **Antimalaria Measures.** [Correspondence.]—*Brit. Med. Jl.* 1930. Feb. 8. pp. 259–260; Apr. 12. p. 718; Apr. 26. p. 797; May 3. p. 840; May 17. pp. 928–929; May 17. p. 929.

Sir Malcolm Watson attacks Col. JAMES's theories of malaria prevention, as interpreted in the *British Medical Journal's* review of his recent report on Kenya and Uganda. Sir Malcolm Watson states that 29 years' experience of malaria in the tropics has led him " to conclusions directly opposite to those of Col. James," and that the effects of diet, housing, economic status, and general sanitation are practically negligible. He taunts Col. JAMES and his followers with having accomplished nothing by the methods which they advocate; " should we not ask the 'modern school,' " he writes, " where have you attempted to control malaria, and what have been the results? When that question has been answered, we will know the value of their advice, in a matter of vital interest to the Empire." As an example of what has been accomplished by antilarval measures, Sir Malcolm instances their efficacy in protecting the labourers engaged on certain public works in Singapore, and he states that the application of such methods has enabled malaria to be controlled in ever-widening areas in Malaya, and has saved tens of thousands of lives and an incalculable amount of money in Singapore.

[A summary of Col. JAMES's report appears on page 631 of this number of the *Bulletin*. In this report Col. JAMES recommends that drainage and other direct methods of attacking the mosquito, similar to those adopted in Malaya, should be employed in towns and estates; but he argues that such methods cannot be applied to a semi-nomadic indigenous peasantry, numbering 2½ million people scattered over an area of 200,000 square miles. Malaria has been successfully controlled in many towns and estates in Malaya; but, taking the country as a whole, malaria heads the list of diseases as the chief cause of sickness and death. The following paragraph occurs in the last annual report of the Principal Medical Officer of the Federated Malay States. " In the report by the Chief Health Officer will be found tables showing the number of deaths due to malaria throughout the country annually for the last ten years, and the annual death-rate from malaria for the four states and the four large towns over a period of seven years. Study of these tables reveals little progress in the mastery of the disease during this period."]

Colonel Gill writes with reference to Sir Malcolm WATSON's letter, above, deploring the baneful influence of this difference of outlook upon the prosecution of anti-malaria measures, and " the fact that the old school of malariologists have endeavoured to establish their viewpoint by means of unsubstantiated claims regarding their successes, and by their declamations, mainly in the lay press, against the stupidity and

ignorance of those who presume to differ from them." The lay administrator, writes Colonel Gill, is deterred from sanctioning expenditure on malaria research because, according to the old school, this is unnecessary; he is likewise deterred from attempting to combat malaria in places where men, money, and material are not available for anti-larva measures, because he has been told by the same "high authority" that the only way to control malaria is to destroy all mosquitoes. Colonel Gill concludes that "one of the chief apostles of malaria control has unwittingly become one of the chief obstacles to progress in a matter of vital importaace to the health and welfare of the Empire."

Sir Ronald Ross writes that mosquito control is similar to the measures undertaken by agriculturalists to protect their crops against the pests which attack them. These measures always cost money, but the agriculturalist finds it is worth his while to employ them; malaria, too, costs money and it is worth while preventing it. Sir Ronald doubts if there is a cheaper method of control. "There is only one school of competent malariologists—those who do the work."

The letters of Dr. Tertius CLARKE, Col. W. G. KING and Mr. R. Senior WHITE, also contribute to this discussion.

W. F.

KNOWLES (R.). **An Account of a Brief Tour with the Malaria Commission of the League of Nations.**—*Indian Med. Gaz.* 1930. Jan. Vol. 65. No. 1. pp. 30–34. With 3 text figs.

The Commission has spent five months in India, and has visited the most intensely malarious parts. Col. Knowles who accompanied its members during their three days' tour of the Singhbhum District, along the Bengal-Nagpur Railways, states that they were greatly impressed by the method of diagnosis by blood-culture which is employed at the Calcutta School of Tropical Medicine as a routine measure in malaria. The tour took the party through the water-logged tract of Santiagachi where there are many better-class Bengali houses lying deserted; this is attributed partly to a tendency to migrate to the city of Calcutta, partly to malaria, and partly to kala azar. They passed through country where the control of malaria would be too expensive to make it worth while, until they came to Messrs. Tata's iron mines at Noamundi, where the disease was formerly prevalent. Control was begun here in 1929, after a preliminary survey by Sir Malcolm WATSON and Mr. SENIOR-WHITE. The river, which was the chief source of malaria, has been trained, subsoil drains have been put in, pools along the river have been oiled, and the houses have been screened. Here the ideal has been realized of a malaria-free enclave within a malaria-ridden district. "Noamundi mine is now entirely free from both larval and adult anophelines, and the only cases of malaria which occur are relapses." Outside the protected area there is free anopheline breeding, and an intense malaria incidence. "It was obvious that such principles are only applicable by some of the wealthiest commercial concerns in India;" but at Dangoaposi, the junction through which all the ore from the mines passes, very little money was available, and yet much has been accomplished by filling swamps and borrow-pits, and by regular oiling. "Dangoaposi Station presents a malaria control almost as

perfect as that at Noamundi Mines, but at absolutely minimum cost. The moral of Dangoaposi Station is, we believe, applicable to vast tracks of India, especially to big commercial concerns." At a malarious place named Uluburu the Commission visited a lake which has formed in a disused manganese quarry. It is notable because, for some reason unsolved by chemical analysis, " its water is absolutely inhibitory to the breeding of mosquito larvae ; they simply cannot live in it." Mr. Senior-White, the malariologist of the railway, told the Commission that he had found that control within a radius of half a mile was effective. He had great difficulty with *A. culicifacies* which " if limited, can take refuge in the usual breeding sites of *A. rossi*." Professors Schüffner and Swellengrebel concluded, from the results of spleen examinations, that malaria in the most intensely hyper-endemic areas of India could not compare with conditions in the Dutch East Indies. Further, Professor Swellengrebel considered that control within a half-mile radius was quite inadequate.

W. F.

Banerjea (A. C.). **Some Observations on an Unusual Epidemic of Malaria in the City of Lucknow (April-September 1929).**—*Indian Med. Gaz.* 1930. Mar. Vol. 65. No. 3. pp. 149–153.

Lucknow has a population of some 200,000 and it is interesting to note in comparison with the statistics of European cities that, in 1928, the death rate was 46 and the birth rate 52. There are no records of an epidemic of malaria having occurred in the city. The spleen rate was 3·1 in 1913 ; since then antimalarious schemes have been in progress and in 1923 the rate had fallen to 1·4. The breeding grounds of mosquitoes are the banks of the river on which the town is situated, tanks, lakes, casual collections of water and wells, and stagnant pools in the bed of an old, dried-up, water-course. In January, 1929, double the usual numbers of fever patients were admitted to the city hospitals, and, from April onwards, there were four or five times as many. Two-thirds of the cases were benign tertian infections. The wells were found to be breeding large numbers of *A. stephensi*, and seven out of 75 mosquitoes were found to be infected, five of them with sporozoites. The disease was most prevalent in the heart of the town where there was the largest number of wells.

W. F.

Basu (B. C.). **The *Anopheles stephensi* Problem in Calcutta.**—*Indian Med. Gaz.* 1930. Apr. Vol. 65. No. 4. pp. 185–191. With 4 text figs. [21 refs.]

There is very little malaria in Calcutta ; the Health Officer of the Corporation reported that the death-rate from malaria, for the six years 1922 to 1927, varied from 1·1 to 1·6 per mille. Some years ago, Col. S. P. James examined 140 children without finding any with enlarged spleens. The main breeding places of *Anopheles stephensi* within the

city are receptacles in which water is stored—cisterns, barrels, tubs, and jars. The obvious remedy is a continuous, high-pressure, water supply which will render the storage of water unnecessary.

W. F.

RAMSAY (G. C.). **Assam's Malaria Problems and their Solution.**—*Lancet.* 1929. Dec. 28. pp. 1356–1358. [1 ref.]

——. **The Factors which determine the Varying Degrees of Malarial Incidence in Assam Tea Estates and the Fundamental Principles governing Mosquito Control of Malaria in Assam.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Mar. 17. Vol. 23. No. 5. pp. 511–518. [6 refs.] [Labac Central Hosp., Dewan P.O., Cachar, Assam.]

Anopheles minimus is almost entirely responsible for the malaria of Assam. In the dry cold season it is prevalent in the low-lying, flat land, where it breeds in clear water at the edges of slow-running streams and pools. When the monsoon breaks, the streams become rapid and muddy, and the clear pools become covered with algae. These monsoon conditions are uncongenial to *A. minimus*, and it therefore migrates for the summer to higher and safer levels where it breeds in slow-running drains and in seepages and tanks. When the migration is retarded by drought, there is an increase of malaria on low-lying land; on the contrary, when migration is hastened by early rains, there are early epidemics of malaria in the high land. The period of infectivity of *A. minimus*, in nature, is from the middle of April until the end of the year. The efficient control of malaria is dependent on measures directed against the summer breeding grounds. Flooding and flushing by the rains account for the greater healthiness of the low-lying tea estates and rice fields. The clearing of jungle in the hills is followed by outbreaks of malaria. The author considers that the planting of Cassia, or a kind of privet known as Duranta, in order to shade the streams and drains may prevent the breeding of *A. minimus*. He proposes to deal with swamps and seepages by drainage, or possibly by planting thick vegetation such as Tarapat (see this *Bulletin*, Vol 26, p. 909); but in view of the fact that MACGREGOR found *A. funestus* (which is almost, if not altogether, identical with *A. minimus*) breeding in shaded streams and rivers in Mauritius, he does not intend to advocate any type of shade until further knowledge has been gained.

W. F.

SPEEDY (W. D.) & ADHIKARI (A. K.). **A Record of Malarial Cases in the Bengal-Nagpur Railway Construction Hospital Titlagarh from July 1928 to August 1929, with Some Observations on Mosquito Findings and Conditions of Transmission.**—*Indian Med. Gaz.* 1929. Nov. Vol. 64. No. 11. pp. 629–631.

The malaria season in this district begins about a month after the commencement of the rains, and it goes on until December though *A. culicifacies*, the carrier, stops breeding three months earlier. This fact is interesting in view of SWELLENGREBEL's theory of "gono-trophic dissociation." (See above, p. 196.)

W. F.

GRAHAM (J. D.). **Collected Memoranda on the Subject of Malaria. Reprinted from Government of India Reports (1847-1924).**— *Records of the Malaria Survey of India.* 1930. Mar. Vol. 1. No. 2. pp. vi+203. With 4 plans (3 folding), 1 folding diagram & 9 charts (6 coloured & 2 folding). Calcutta: Thacker, Spink & Co. [Rs. 12–8 or 16s. 8d.]

This consists of reprints of certain memoranda of particular historic and scientific value, included in Government papers during the last eighty years. One of the most interesting is the report of a Committee consisting of two engineers and Surgeon T. E. DEMPSTER, which was appointed in 1845 to enquire into the causes of unhealthiness along the course of irrigation canals. The task of this Committee appeared, at first, to be hopeless because no trustworthy statistics were available, but the difficulty was overcome by the ingenuity of Surgeon DEMPSTER. It occurred to him that "the inhabitants of unhealthy districts in India often carry in their own persons a record of past suffering, which can at all times be easily read, and which no one can either falsify or suppress, this is enlargement of the spleen." He suggested "that the condition of the spleen in any number of individuals would be a fair test of the probable frequency and degree in which they had suffered from malarious influences." At each place, twenty children and twenty adults were selected for examination; DEMPSTER considered children to be the more delicate test of malaria. He drew attention to the importance of examining the spleens of the inhabitants before selecting a site for an encampment. "However healthy a locality may appear in other respects," he wrote, "if its native inhabitants are generally afflicted with organic disease of the spleen, there beyond all doubt does much malaria exist, and there also will European and native troops suffer." The Committee found then, as many similar committees of enquiry have found since, that much malaria is man-made. The disease was generally, though not universally, more prevalent in the districts irrigated by the canals, and they reported that by far the greater part of the evils which they observed was not the necessary and unavoidable result of canal irrigation, but was due to obstruction of the national drainage of the country. Their recommendations might have been drawn up to-day:

"We feel doubtful whether any suggestion proceeding from authority, as to mode of life, exposure, food, clothing and construction of houses, would be adopted and voluntarily practised by the agricultural population. The best and most efficient prophylactics of this class, naturally come with competence and ease, but much might be done to improve the salubrity of village sites, viz.: to stop irrigation within two hundred yards round all canal villages . . . to deepen all good village tanks, and to keep them full of water all the year round—to drain all shallow pools in or about villages, or to convert them into proper reservoirs of water—and, wherever it may be possible, to improve the drainage of village sites."

In a report written in 1909, Col. J. W. T. LESLIE criticized the statement, which is so commonly made, that five million persons die annually in India from malaria. He pointed out that the mortality returned in most parts of the country under the heading "fever" included many diseases in addition to malaria, and that special enquiries and dispensary returns indicated that only about one-fourth of the deaths was due to malaria. He found that the death rate from malaria among the prisoners in the gaol was only one-fifth of that among the general population, and from this he argued that nearly three-fourths of the fever deaths among

the people could be prevented if they could be placed under favourable hygienic conditions, given prophylactic doses of quinine and provided with skilled medical attendance. In connexion with these recommendations it is interesting to read the departmental reports (1920) on the free distribution of quinine and its sale below market price, which are printed on page 196. These reports make it fairly clear that, on the whole, it was a failure. In the Punjab, for instance, the poor did not buy the quinine and it was suspected that a good deal was purchased by Indian druggists ; in Burmah, large quantities fell into the hands of speculators who created an organization for selling at greatly enhanced prices ; in Bihar and Orissa, quacks and chemists bought it in large quantities for compounding their medicines ; from Delhi, it was reported that " the real objection to such distribution is the inevitable waste, as the remedy is rarely absorbed under right conditions, or in proper quantities."

On page 149, the conclusions reached at a meeting of Sir E. MACLAGAN, Sir Pardy LUKIS, Lieut.-Colonel CLEMESHA and Major Norman WHITE, held in January 1916, are set out. With reference to quinine they concluded that " very little can be expected from the prophylactic issue of quinine in a free, uneducated population under no sort of discipline or control." They agreed that malaria was on the increase in parts of Bengal which were formally subject to annual inundation from the rivers of the Delta, but were now protected from flooding by embankments. In the absence of inundation, the land had become impoverished and the consequent poverty of the inhabitants was an important factor in the prevalence of the disease ; depopulation, a marked feature of the worst areas, was attributable both to malaria and to impoverishment of the soil. Those areas in Lower Bengal still subject to inundation were relatively little affected with malaria.

On page 163, there is an important report by Lieut. Col. CLEMESHA, written in 1917, on the influence of railway construction on malaria.

" I do not think that it can be denied," he writes, " that owing to deficient sanitary arrangements, or other causes, during the aggregation of labour for construction work, epidemics of malaria and other diseases have occurred, and very large tracts of country have been rendered extremely unhealthy . . . and the blocking of drainage with embankments sometimes occasions the ill-health of the rural population. . . . Before the railway was constructed, Ennur was one of the health resorts of Madras. Since the construction of the railway bridge over the backwater, the place has been practically uninhabitable on account of the prevalence of malaria. . . . We are probably still suffering in Bengal from the direct results of an epidemic which was primarily started by the construction of the line between Calcutta and Burdwan in the 'fifties."

On page 137, is a report, made in 1912, by the Secretary to the Government of the United Provinces, Sanitation Department, with regard to " millions," in which it is stated that " the conclusion on the whole subject seems to be therefore that ' millions ' are incapable of withstanding the climatic conditions of this country in the hotter tracts, and that they are not markedly superior to indigenous varieties of fish as larvae destroyers."

Many other important reports are republished, but it is impossible here to do more than mention two of them ; for example, one written by Sir Leonard ROGERS in 1917 on the forecasting of malaria epidemics ; and another, by Col. R. D. MURRAY on the great epidemic in the United Provinces during 1908, when 1,141,079 persons died of malaria.

W. F.

Walch (E. W.) & Schuurman (C. J.). **Saltwater Fishponds and Malaria.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1929. Vol. 18. No. 3. pp. 341–366. With 14 figs. & 1 plan on 8 plates. [9 refs.] [Med. Lab., Weltevreden.]

—— & ——. Zoutwatervischvijvers en malaria.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. Mar. 1. Vol. 70. No. 3. pp. 209–234. With 9 figs. & 1 plan on 6 plates. [8 refs.] [Med. Lab., Weltevreden.]

This paper is an instructive example of the value of making a thorough scientific enquiry before embarking upon an extensive sanitary engineering scheme. The salt water fish-ponds of Java cover an area of about 140,000 acres and give a yearly profit to the population of about seven million florins. The fish, or *bandeng* (*Chanos chanos*), breed in the sea; their fry is caught along the coast and transferred to the shallow artificial ponds, where they feed on algae. The algae of these ponds are of two kinds: green, floating, surface-algae (*Enteromorpha*, *Chaetomorpha*, etc.), and a brownish mass of blue bottom-algae (*Cyanophyceae*, diatoms, etc.) which the natives call water-dung. The surface-algae form a network, in the meshes of which *Anopheles ludlowi* breed in great number, secure from the attacks of their mortal enemy, *Haplochilus panchax*—the little "tin-headed" fish of the Javanese. The fish-ponds are responsible for so much malaria, that it was proposed that they should be abolished by filling them up or by breaking down their banks and letting in the sea. Either of these methods would be tremendously expensive and would destroy a profitable native industry; moreover, the less costly method of letting in the sea often fails to destroy the algae and the anopheles. In the district of Pasoeran, in East Java, the authors found fish-ponds free from surface-algae and the population free from malaria. The natives in this district have adopted the custom of laying dry their fish-ponds once a month. The sun reduces the green surface-algae to dust, but it does not destroy the bottom-algae or water-dung. When the water is let in again, the bottom-algae form bluish or blackish green masses, and large flakes rise and float on the surface, like pieces of cow-dung. They are compact masses, which anopheles larvae cannot enter, and they are quickly devoured by the bandeng. It appears that the fish can be reared as successfully on this water-dung as on the green surface-algae, and the authors believe that it will be possible to render the fish-ponds harmless by the adoption, in other districts, of the Pasoeran system of emptying the ponds once a month, without injuring the fish-breeding industry.

W. F.

Manalang (C.). **Malaria Studies.**—*Jl. Philippine Islands Med. Assoc.* 1929. Dec. Vol. 9. No. 12. pp. 437–439.

The author bewails the inaccuracy of statistical returns of malaria. The provincial malaria mortality returns showed 26,000 deaths from malaria in 1926, 19,000 in 1927, and 13,000 in 1928. The author does not attribute this 50 per cent. reduction to preventive or curative methods, but to better diagnosis. Only 10 to 15 per cent. of supposed malaria deaths could be confirmed by post-mortem examination. In one district where none of the children had enlarged spleens the record showed 12,000 deaths from malaria; in another

province where 90 per cent. of the children had enlarged spleens, and the parasite rate was 85 per cent., there was no record of a death from malaria for two years. "Appraisement of the amount and ravages of malaria should be based only on a careful scientific survey in competent hands, and not on a compilation of data carelessly or unscientifically collected." The carrier in the Philippines is *A. funestus minimus*, which breeds in streams and sometimes in irrigation ditches, but not in swamps, pools, or artificial containers. It is not attracted by cattle; precipitin tests showed that 80 per cent. contained human blood. It has a range of 1·5 kilometres.

W. F.

Morin (Henry G. S.). Considérations sur l'enquête malariologique en Cochinchine : son but, sa technique, les services qu'on peut en attendre. [**The Malaria Survey in Cochin China : its Object, its Technique, and the Service that can be expected from it.**]—*Bull. Soc. Méd. Chirurg. Indochine.* 1929. Aug.–Sept. Vol. 7. Nos. 8–9. pp. 436–454. With 3 charts in text. [Pasteur Inst., Saigon.]

This is a general outline of the principles and methods of a malaria survey, with classical examples of the results of control in Panama, the Malay States and elsewhere. The author's experience in Cochin China that *A. maculatus* is rarely caught in houses is the same as that of investigators in Malaya. He caught 472 adult mosquitoes in 58 houses; 176 were *A. minimus* and only 3 were *A. maculatus*.

W. F.

d'Anfreville de la Salle (L.). La lutte contre le paludisme à Casablanca en 1929. [**The Antimalaria Campaign at Casablanca in 1929.**]—*Presse Méd.* 1930. Jan. 1. Vol. 38. No. 1. pp. 11–12. With 1 text fig.

——. Un moyen de lutter contre le paludisme au Maroc. [**A Method of dealing with Malaria in Morocco.**]—*Bull. Soc. Path. Exot.* 1930. Jan. 8. Vol. 23. No. 1. pp. 53–58.

The abundant rains of 1927 and 1928 converted the low-lying parts of Casablanca, the racecourse and open spaces into swamps which did not dry up in the summer. In all, some 20 acres within the Municipal area were turned into marsh. The tribesmen who flocked to the city supplied the source of infection; there was a severe epidemic, and the total number of deaths from all causes in 1928 was 1,766 higher than in the previous year (total population 130,000). The disease began in an aviation camp near a permanent swamp on the outskirts of the town, and gradually spread towards the centre. It failed, however, to reach the Jewish quarter away from the marshes, in spite of its grievous sanitary condition. The recommendations of the M.O.H. were: (1) to straighten the streams; (2) to drain or fill the permanent marshes to a distance of 1 km. beyond town limits; (3) to deal with the large collections of water which cannot be got rid of, either by oiling or by larvivorous fish. Quinine was supplied to school children. Gambusia and Cyprins were put into some of the marshes. The anopheles season begins in April, but the marshes were not drained until July; at the latter date the streams were straightened and the swamps connected with them were abolished. The year 1929 was

exceptionally healthy in Casablanca, and the Bureau of Hygiene attributed the improvement to the draining of the breeding places, but 1929 was not a fever year in most regions of Morocco. W. F.

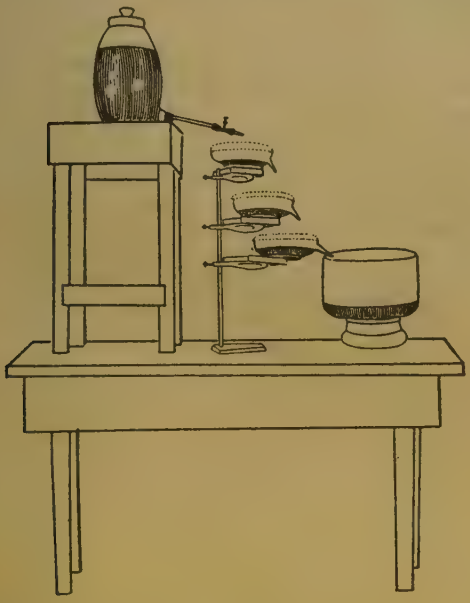
ANDERSON (T. Farnworth). **Report on an Investigation of Health Conditions on Farms in the Trans-Nzoia, with Special Reference to Malaria.**—*Kenya & East African Med. Jl.* 1930. Jan. Vol. 6. No. 10. pp. 274–308. With 7 charts. [1 ref.]

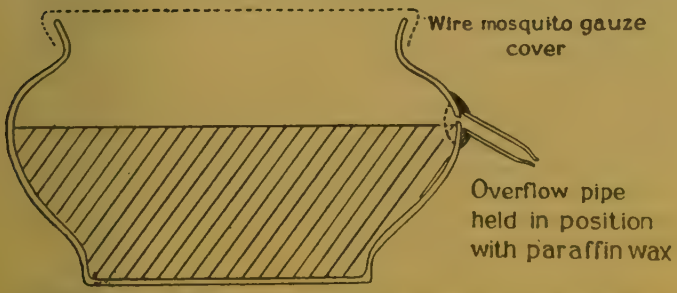
Dr. Anderson has tried to find a practicable method by which settlers may reduce the incidence of endemic malaria among the members of their labour forces by means of quinine. He points out that such a method can only be regarded as a temporary measure to prevent the infection of anopheles whilst steps are being taken to reduce their numbers. With this object in view, he administered a single dose of quinine, once a week, to a number of labourers and their children. The dose was 15 grains of the bisulphate in solution for those over 10 years of age, 10 grains for those between 5 and 10 years, 5 grains for those under 5 years. The quinine was administered personally by Dr. Anderson. Blood films were examined at the beginning of the experiment, and at the end of the fifth, ninth, and thirteenth weeks. In the first experiment, with about 75 persons under treatment and 40 controls, the general May–June rise in the parasite-rate took place only in the controls. At the end of the thirteenth week, parasites were found in 54 per cent. of the controls and 31 per cent. of the quinine group; the gametocyte-rate was 19 per cent. in the controls and 7 per cent. in the quinine group. The numbers were small, and only about two-thirds of the subjects were available for examination on all four occasions. In a second experiment, Dr. Anderson treated the whole of a labour force in order to avoid infection from untreated controls. The labourers and their children, a group of 116 persons, were treated weekly for four weeks, with the result that the parasite-rate was reduced from 44 to 8 per cent.

Dr. Anderson has visited a large number of the farms in the Trans-Nzoia District, where malaria is the most important disease in all communities, and where there was a severe epidemic in 1928. The common types are subtertian and quartan; benign tertian is rare. Malaria is most prevalent in May, at the time of the greatest rainfall, and blackwater fever occurs about two months later. The native children are the main reservoirs of infection; the spleen-rate, the parasite-rate, and the gametocyte-rate are all at their maximum in children under 6 years of age. The gametocyte-rate in children between 1 and 7 years is 25 per cent.; after 10 years of age it is less than 2 per cent. and such a degree of immunity is established that, in spite of the high spleen and parasite rates, pyrexial attacks are uncommon, and the average haemoglobin index is as high as 87 per cent. Malaria in Trans-Nzoia is a man-made disease. The untouched streams are heavily shaded by trees and thick bush; *A. costalis*, the carrier, which prefers open water exposed to sunlight, will not breed in them, but a prolific breeding-ground is made when the vegetation is removed and the water is dammed up to make a drinking place or washing pool for the labourers and cattle of the farms. The borrow-pits on many farms, formed in the course of brick-making and building, are another source of mosquitoes; a third breeding-place is the unmetalled road full of ruts, of which there are hundreds of miles in the district. W. F.

Gordon (R. M.) & Macdonald (G.). **The Transmission of Malaria in Sierra Leone.**—*Ann. Trop. Med. & Parasit.* 1930. Apr. 7. Vol. 24. No. 1. pp. 69–80. With 1 text fig. [27 refs.] [Sir Alfred Lewis Jones Research Lab., Freetown, Sierra Leone.]

The common anopheles in Sierra Leone are *A. funestus*, *A. gambiae*, *A. rhodesiensis*, and *A. mauritianus*. *A. gambiae* is essentially a house-





Modification of Boyd's Drip Apparatus used for the rearing of anopheline larvae. The upper reservoir, containing a dilute emulsion of yeast in water, discharges into a series of gauze protected jars in which larvae are placed; the alkalinity of the water in these breeding jars is conserved by adding a small quantity of calcium carbonate. The glass dishes are of the type used for the exhibition of confectionery in shop windows. The hole for the overflow pipe is drilled with a diamond and covered with a fine gauze screen to prevent young larvae being washed away.

[Reproduced from *Annals of Tropical Medicine and Parasitology*.]

haunting mosquito and is usually far in excess of other species, though it is absent at certain seasons. It feeds voraciously on man, both by day and night. The average natural infection rate of adults caught in houses is 7·1 per cent. The authors found 2 out of 21 infected. Three mosquitoes, out of 21 which they fed on crescent cases, became infected in the salivary glands. They conclude that *A. gambiae* is the most important transmitter in the country. It was found possible, but not easy, to infect *A. rhodesiensis*, and this fact combined with the rarity of the species in houses led the authors to conclude that it was not an important carrier in Sierra Leone. Experiments were also carried out with *A. smithii*, an anopheline which is found only in the neighbourhood of Mount Aureol, near Freetown. No naturally infected specimens were caught ; it did not bite readily, but 2, out of 6 which fed, became infected. The authors consider that it plays a small, but very local, part in the transmission of malaria. Only laboratory-bred mosquitoes were used for the experiments, and a modification of Boyd's drip apparatus was employed [see figure, p. 643]. W. F.

Schwetz (J.) & Baumann (H.). **Study of the Malaria Index in Young Natives of School Age in the Settlement of Stanleyville (Congo Belge).**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Nov. 25. Vol. 23. No. 3. pp. 279–288. [1 ref.]

Stanleyville is a settlement of about 300 Europeans, situated on both banks of the Congo, a little to the north of the equator and at the foot of the Stanley Falls. Mosquitoes are uniformly prevalent and malaria persists with equal intensity, year in, year out. A vast native population, in numerous villages and compounds, encircles the European settlement. *A. gambiae* (*A. costalis*) far outnumbers all the other species of anopheles put together, and is very common in native huts. The sporozoite index of this mosquito was found to be 11·5 per cent., and the index of 1,469 anopheles of various species was 9·25. The authors examined 952 apparently healthy children and adolescents, from 5 to 20 years of age, in the schools of Stanleyville, with the result that they found parasites in the blood of 85·5 per cent. and enlarged spleens in 84·7 per cent. A thick drop and a thin film were examined in each case. The authors consider that the true infection rate was about 100 per cent. They found that the proportion of persons with small numbers of parasites, and only moderately enlarged spleens, diminished very slowly as the age increased ; extreme splenomegaly was found almost exclusively in infants. Subtertian infections were the rule, but quartan parasites were present in nearly one-fourth of the cases. *P. vivax* was not found. Gametocytes were found in 34·7 per cent. " It is needless to insist on the danger of this immense reservoir of virus." (See this *Bulletin*, Vol. 26, p. 939). W. F.

Legendre (F. M. A.). Note sur le fonctionnement du service antipaludique à Madagascar. [**A Note on the Working of the Antimalaria Department in Madagascar.**]—*Bull. Soc. Path. Exot.* 1929. Dec. 11. Vol. 22. No. 10. pp. 1016–1028 and 1930. Jan. 8. Vol. 23. No. 1. pp. 122–132. With 1 text fig.

The antimalaria service of Madagascar was reorganized in 1927, and the author has been in charge since the end of that year. The possibility of growing cinchona in the island is under investigation, but it will be

several years before the results of this attempt are known, and the shallow soil overlying an impermeable bed of laterite makes success doubtful. The Spanish method of staining blood films is employed : 3 drops of blood are stirred up with a needle on a slide until they are defibrinated. After drying, the film is stained with a solution of Giemsa (1½ drops of Giemsa to each 1 cc. of distilled water) for a quarter of an hour ; the stain is then poured off, without washing, and a solution of Leishman's stain, of the same strength, is poured on. At the end of a quarter of an hour, the slide is lightly washed in ordinary water, dried, and examined. The spleen rate, at Antananarivo, is 77·6 per cent., including spleens enlarged but impalpable. The parasite index varies from about 10 to 20 per cent. *P. vivax* is more common in the dry, cold season ; *P. falciparum* is more common in the damp, hot weather ; *P. malariae* does not occur in Madagascar.

Antananarivo, the capital, is surrounded by rice-fields, some of which extend into the town itself. The cultivation of rice within a certain radius has been forbidden by law, but unfortunately no provision was made for drainage, and the fallow land has become a veritable nursery for *A. costalis*, the carrier. Funds are not plentiful and Dr. Legendre has a difficult task before him ; in many places, owing to the lie of the land, costly engineering works are necessary before drainage can be effected. Minor works have been carried out, and "stoxal" and Paris green have been used. Gambusia have been imported, but, before they are distributed, observations are being made to determine whether there is any danger of their destroying the eggs of the edible fish of the country, as the "millions" appear to have done in the island of Mauritius. The population is very ignorant, and they are repeatedly led astray by rumours of the ill effects of treatment and blood testing. The local doctors are moreover insufficiently trained to examine blood films ; diagnosis is faulty and much quinine is wasted. W. F.

Reichenow (Eduard). Zur Frage der Malariaresistenz bei Negern. [**Malarial Resistance in Negroes.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 58–64 (142–148). With 1 text fig. [3 refs.]

Observations were made on 176 Haussa negroes in a village near Carnot in Cameroon during the war. The author sets forth his results in a table. The ages were from under five years up to over 40 years. The blood was examined for parasites and the temperature was taken. He considers that resistance to parasites is not present to any extent in children, but increases with age and reaches its highest point when the body is fully developed ; after that it does not increase. Judged by temperature observations the Haussa negroes have a high degree of resistance to the malarial toxin, which is observed even in quite small children. He considers therefore that toxin resistance is inherited, but not parasite resistance. E. D. W. Greig.

Peller (Sigismund). Die Malaria und deren Bekämpfung in Palästina. [**Anti-Malarial Measures in Palestine.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. Mar. 28. Vol. 116. No. 2/3. pp. 132–160. With 4 charts in text. [10 refs.]

The author sums up the post-war position in Palestine as follows : (1) Systematic antimalarial measures in Palestine are confined to

therapy, antilarval measures and clearing the ground. (2) The fall in malarial morbidity in the first years of antilarval control was not due to this measure. It did not prevent the malarial position from becoming much worse in the years 1926, 1927 and 1929. The morbidity amongst the Jewish emigrants varies within wide limits, from 0 to 100 per cent. (3) The percentage of the total malarial cases due to quartan and malignant tertian infection is markedly reduced. The benign tertian infection reaches its peak in autumn. The relapse frequency is reduced. These changes are independent of the prophylactic measures which were carried out. Of great importance in connexion with malaria is the probability of relapse and the duration of the period of freedom from attack ; this applies equally to the primary infection and to the relapse. (4) The view that children show a greater malarial morbidity than adults is not in accordance with the experience of the Jewish emigrant families of Palestine.

E. D. W. Greig.

Reitler (Rudolf). Ueber die Rolle der Imaginesbekämpfung in der Malariaverhütung. [**The Role of Anti-Mosquito (Adults) Measures in the Protection from Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Apr. Vol. 34. No. 4. pp. 198–210. With 4 text figs. [1 ref.]

The author was in charge of anti-malarial work for the Palestine Electric Corporation during the construction of the Jordan Power Scheme. The species of anopheles were, *A. elutus*, which breeds exclusively in still water, and *A. superpictus* and *A. sergenti*, which breed in slow running water. *A. elutus* and *A. superpictus* have two peaks of reproduction, one in the beginning of summer and the other in autumn ; *A. sergenti* has only one such peak at the beginning of autumn. In winter reproduction is almost at a standstill and in the middle of summer it is diminished. The author concludes that measures against the imagines are of great importance for protection from malaria.

E. D. W. Greig.

i. Makarjin (A. A.). Malariamückenbekämpfung im früheren östlichen Buchara (Tadshikistan) in den Jahren 1924–1927. [**Anti-Mosquito Measures in Tajikistan, formerly Eastern Bukhara.**]—In " Die tierischen Parasiten und einige parasitäre Krankheiten des Menschen in Tadshikistan " [Pawlowsky (E. N.), Edit.]. Leningrad. 1929. pp. 13–25. With 2 plates. [In Russian. German summary pp. 25–27.]

ii. Massaitis (I. I.). Malariabekämpfung in der Stadt Kuljab (Tadshikistan). [**Anti-Malarial Measures in the Town of Kuljab (Tajikistan).**]—*Ibid.* pp. 28–39. With 3 text figs. [In Russian. German summary p. 40.]

iii. Latyschew (N. I.). Zur Biologie der Mucke *Anopheles superpictus* Grassi. [**Biology of *Anopheles superpictus* Grassi in Tajikistan.**]—*Ibid.* pp. 41–58. With 2 figs. & 3 plates. [In Russian. German summary pp. 58–59.]

i. Malaria in this Republic causes great damage : thus in the course of 11 months from October, 1926 to September, 1927, 3,660 workers were rendered unfit for work with a loss of 29,700 working days ; during this period, 157,250 roubles were disbursed as sick relief, and 70 per cent. of this sum was received by malarial patients. Various anti-malarial measures have been undertaken actively since 1927 ; e.g., rice cultivation has been

forbidden within 3 kilometers of inhabited places, drains cleared, river margin trimmed and the beds deepened. In 1928 a station for malarial investigation was started at Dushambe.

ii. Anti-malarial measures similar to the above were carried out in the town of Kuljab with the result that, from 1925 to 1927 the number [not stated in summary] of malarial cases in the local garrison diminished ; the endemic index fell from 64·6 to 7·4 ; the index of Ross from 2·30 to 1·07 ; the parasite index from 34 to 3·7 ; and the spleen index from 60 to 3·7.

iii. *Anopheles superpictus* is found chiefly in the plains and low foot hills of Turkestan, but it has been got up to 1,500 metres. It enters human dwellings readily, but is not found on domestic animals. Both adults and larvae hibernate in winter. As a vector of malaria it plays the most important rôle. Paraffin and paris green are recommended for antilarval measures. The other species are *A. bifurcatus, A. pulcherrimus, A. claviger, A. elutus.*

E. D. W. Greig.

RUCHADSE (N.). Haustiere und Malaria. [**Domestic Animals and Malaria.**]—*Nachrichten der tropischen Medizin.* Tiflis. 1929. Vol. 2. No. 9–10. [In Georgian script. German summary pp. 704–705.]

An example is given of a village in Georgia where one-half of the inhabitants (Armenians and Greeks) stable their domestic animals, and the other half (Georgians and Abkhasians) do not. In this village the Armenians and Greeks showed : Spleen index, 24·7, Ross's index, 1·8, parasitic index, 11·2, endemic index, 29·2 : on the other hand the Georgians and Abkhasians of the village showed : spleen index, 51·6, Ross's index, 3·2 parasitic index, 14·6, endemic index, 56.

E. D. W. Grieg.

DE BUCK (A.), SCHOUTE (E.) & SWELLENGREBEL (N. H.) Zur Kenntnis des Anophelismus ohne Malaria in dem Küstengebiet der Niederlande. [**Anophelism sine Malaria in the Coastal Area of the Netherlands.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Dec. Vol. 33. No. 12. pp. 619–631. With 2 maps & 1 fig. in text. [13 refs.] [Inst. for Trop. Hyg., Amsterdam.]

The authors have extended their previous investigations (see this *Bulletin*, Vol. 26, p. 915). They conclude that the essential cause of anophelism sine malaria is the tendency of the transmitting mosquito species to split into local forms. The authors find two forms of *Anopheles maculipennis* in the Netherlands, a short and a long winged variety ; the former, which does not hibernate, is especially characteristic of malarious regions. Very slight biological variations convert the *Anopheles maculipennis* of the Netherlands into a porter ; thus the mere continuation of feeding on blood after the cessation of the reproductive activity, has as a consequence the autumnal spread of malaria. As regards the morphological distinctions of the mosquito which can be correlated with the biological ones and useful indicators of the existence of the latter, nothing can be laid down ; and it would be a mistake [which the authors themselves made] to expect the findings in one country to apply to another.

E. D. W. Greig.

KORTEWEG (P. C.). Die epidemiologische Bedeutung der Neuinfektionen mit Malaria tertiana im Herbst. [**Epidemiological Significance of Fresh Infections with Benign Tertian Malaria in Autumn.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1929. Dec. 14. Vol. 110. No. 4. pp. 724–731. With 3 text figs. [7 refs.] [Inst. for Trop. Hyg., Amsterdam.]

The material at the disposal of the author for this study consisted of about 2,000 cases of malaria observed in the course of his practice in the village of Wormerveer, Holland, between 1902 and 1918; for subsequent years he is indebted to his successor. He noted that *primary* attacks of malaria were much commoner in the spring and summer than in autumn. As a result of his observations he reaches the following conclusion: That almost without exception, a high percentage of malarial cases after September 1st forecasts an increase, and a low percentage a decrease of malaria in the following year.

E. D. W. Greig.

SCHÜFFNER (W. A. P.), KORTEWEG (P. C.) & SWELLENGREBEL (N. H.). **Experimental Malaria with Protracted Incubation.**—Reprinted from *Proc. Roy. Acad. Amsterdam.* 1929. Vol. 32. No. 7. pp. 903–911. With 1 text fig. [17 refs.] [Inst. of Trop. Hyg., Amsterdam.]

——, —— & ——. Proefondervindelijke malaria, met lange latentie. *Nederl. Tijdschr. v. Geneesk.* 1929. Oct. 5. 73rd Year. 2nd Half. No. 40. pp. 4622–4629. With 1 text fig. [17 refs.] [Roy. Colonial Inst., Amsterdam.]

It had been maintained on clinical grounds by Korteweg that the malaria appearing in the early part of the year before June 1st, that is to say, before the first summer generation of mosquitoes had emerged, could only be explained by an infection contracted in the previous autumn. This thesis received support from Swellengrebel's observation that malarial infection of anopheles is practically confined to autumn and winter and that it is almost absent during the height of malarial attack incidence. In 1927 JAMES had four patients bitten by infected mosquitoes in November, December and February, all of whom were under observation and only contracted their first malarial attack 6 to 9 months later. Korteweg's experience with his experimental malaria seems at first sight to be a contradiction of his own thesis, as four out of the five patients bitten by his mosquitoes developed malaria in the ordinary incubation time of 10 to 20 days, but then these mosquitoes were heavily infected and the patients were subjected frequently to their bites. The main experiment in support of the contention of a long latency for malaria appearing in the earlier half of the year was carried out on six persons, all volunteers. Four of them were only bitten once and two of them twice, by mosquitoes the degree of whose infectivity was estimated by subsequent dissection. Each of these test individuals had his temperature regularly taken for three weeks after being bitten and had his blood frequently examined. This procedure was continued at occasional intervals thereafter. No indication of parasitic infection was demonstrable in any of them before the actual attack made its appearance, unless the finding in one case of a single pigmented leucocyte can be regarded as such.

All these test persons, who had been bitten between October 30th and November 7th, developed a malarial attack for the first time between June 26th and August 2nd of the following year, that is, some eight months after being bitten. The authors had hoped that their small artificial epidemic would have reached its height in May or June instead of in July. JAMES's patients, however, who were infected in November and December, did not develop their malaria until later

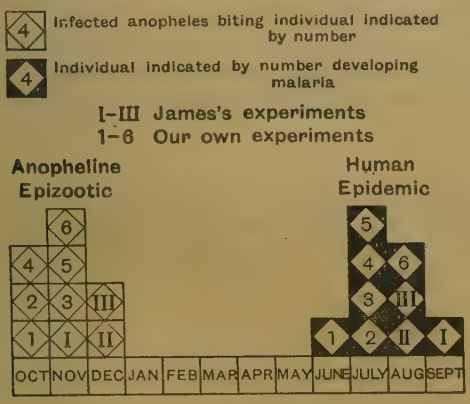

4 Infected anopheles biting individual indicated by number
4 Individual indicated by number developing malaria
I-III James's experiments
1-6 Our own experiments
Anopheline Epizootic
Human Epidemic
OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY AUG SEPT

Diagram representing the combined results of JAMES's and the authors' malaria transmission experiments, to illustrate the possibility of a summer epidemic of human malaria arising from an autumnal epizootic of anopheline infection.

[Reproduced from *Proceedings of the Royal Academy at Amsterdam.*]

still. They consider it probable that if the epidemic were to be brought off in June, it would be necessary to have the mosquito infection at the end of September or beginning of October. Their tests indicate that a mosquito with autumnal infection by human malaria can give rise to malaria not only before but also after the June 1st of the next year.

W. F. Harvey.

OTTOLENGHI (D.) & BROTZU (G.). Sulla sopravvivenza del virus malarico negli anofeli ibernanti. [**On the Survival of the Malarial Virus in Hibernating Anopheles.**]—Reprinted from *Bull. Scienze Mediche.* 1929. May–June. Year 101. Ser. 10. Vol. 3. 4 pp. With 1 chart. [8 refs.] [Hyg. Inst., Univ., Bologna.]

Malarial outbreaks in the spring have been attributed to anopheles biting patients uncured and still harbouring the plasmodium, or to the parasite having reached an early stage in development and remaining dormant in the mosquito during the winter and completing its development when the temperature again becomes favourable. Colonel JAMES has shown that oocysts and sporozoites of *P. vivax* can exist for three months under conditions of artificial hibernation, being kept for short periods at 22° C. and then for 3 weeks at 4°–5° C. and even at times at zero. The authors caught specimens of *A. claviger* in November, 1928,

and allowed them to feed on two successive days on a patient experimentally infected with benign tertian whose blood was rich in gametes. They were then kept in a moist atmosphere for two days at 24° C.,and every two or three at 15°–16° C. They were allowed to feed on a rabbit. From the middle of November to the beginning of March the temperature of their cage was never allowed to rise above 12° C., was often 6° and even 0° C. From mid March to mid April it was raised to 14°–16° and in May to 22° C. A healthy man was then bitten by some of these on three successive days and sixteen days later developed a typical attack of malaria, confirmed by blood examination. The feed of rabbit's blood obviously did not interfere with the development of the plasmodia. The experiments are to be repeated next year with the subtertian parasite.

H. Harold Scott.

Herrmann (O.) & Lifschitz (M.). Intrakutane Reaktion als Diagnose der Malaria. [**Diagnosis of Malaria by Intracutaneous Reaction.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1930. Vol. 65. No. 3/4. pp. 240–244. [19 refs.] [State Inst. for Med. Research Kazan.]

The authors employed watery extracts of blood clot from cases of acute malaria as antigen for the test. The control was horse's blood clot. At first the antigen was prepared from blood containing only *P. falciparum* but later blood containing *P. vivax* and *P. malariae* was employed also. For use the antigen was diluted 1 : 10,000 and 1 : 100,000 and the control 1 : 10,000 with normal saline. The dose is 0·1 cc. injected intracutaneously on inner side of forearm with a fine needle. A strongly positive reaction is indicated by a papule, about 2 by 3 mm. at least, developing after 24 to 48 hours ; if the papule is smaller a weak positive is recorded. A negative result is registered in cases of complete absence of inflammation. In all 105 persons were tested (67 chronic malaria cases without plasmodia in the blood and 38 cases with different species of plasmodia in the blood). The test was strongly positive in 63 (60 per cent.) ; weakly positive in 27 ; in all 85·7 per cent. were positive. Of 15, in which the test was definitely negative, 7 at the moment had a definite febrile attack, during which probably fewer antibodies are present, and 3 were suffering also from other infectious diseases ; if these 10 are not considered the positive reactions would be 94·7 per cent. The test was negative in all healthy persons and those suffering from other diseases examined [the number of the latter was very small]. The authors are continuing their experiments with a view to improving the method.

E. D. W. Greig.

Steinfeld (Fritz). Ueber die diagnostische Bedeutung des Malariapigmentes. [**Diagnostic Significance of Malarial Pigment.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Dec. Vol. 33. No. 12. pp. 631–635. [Inst. for Ship & Trop. Diseases, Hamburg.]

On the suggestion of Professor Mühlens the author repeated the work of Risquez and his pupil Pineda, and also that of Urriola. He studied 30 cases definitely diagnosed as malaria (benign and malignant tertian) at different stages of the disease. He employed a modification of Risquez's method for the examination of the blood and Urriola's

method for the urine. He concludes that the finding of intracellular pigment in blood is good confirmation of the clinical diagnosis. With the methods so far available the presence of free pigment in the blood is not of value for diagnosis. In the urine he finds no pigment which can with certainty be recognized as malarial pigment.

E. D. W. Greig.

GOLDIE (Horatio). **Notes on the Association of Malaria with Nephritis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Mar. 17. Vol. 23. No. 5. pp. 503–510. [36 refs.] [Hadassah Med. Organisation, Jerusalem.]

The author does not agree with the current view that the toxins of *P. malariae* have a more powerful effect in causing nephritis than those of the tertian and subtertian parasites.* He has found that albuminuria and oedema occur more often in peasants from rural districts than in town dwellers; this he believes to be due to the longer duration of the disease among the peasants, before treatment is begun. He attributes the frequency of the same symptoms in quartan malaria to the same cause, that is to say, neglect of treatment. Quartan malaria is less acute than the other forms, and does not drive people to seek treatment so soon; any form of malaria which becomes chronic may cause nephritis by prolonged toxic action on the kidney. He has found that albuminuria in the acute stage of malaria is most common in the subtertian form, but in chronic malaria it appears in all forms of infection. The nephritis is almost always of the hydraemic type (nephrosis), in which there is oedema and a large amount of protein in the urine. Occasionally it is of the azotaemic type (glomerulo-nephritis) in which there is no hindrance to the passage of water and salt, but a distinct failure to excrete nitrogenous products. The author concludes from a study of the published records of post-mortems made in other countries, that the characteristic lesions of malarial nephritis are those of nephrosis, namely, fatty degeneration of the tubules. He found that the nephritis of malaria was completely cured by specific treatment, and that plasmoquine and quinine acted better than either drug alone.

W. F.

ORENSTEIN (A. J.). **Can Quinine Distribution be expected to reduce Malaria in South Africa?**—*Jl. Med Assoc. South Africa.* 1929. Sept. 14. Vol. 3. No. 17. pp. 479–481. [8 refs.]

Quinine has been distributed in the malarious areas of the Transvaal and Natal for a number of years, but no reliable statistics have been kept on which its value can be assessed. The author instances the experiments of YORKE and MACFIE, which showed that quinine has no marked effect on sporozoites, and also the experiments of the brothers SERGENT, which showed that a dose, equal to the ordinary curative dose, is necessary to prevent fever and that, even then, it is not enough to prevent infection. In the course of his own experience

* See this *Bulletin*, page 508; review of GIGLIOLI's "Malarial Nephritis."

in Dar-es-Salaam, prior to the war, quininization was carried on, not only among Europeans but also among natives, and was controlled by regular blood examinations. The doses of quinine were 15 grains daily for 6 days, followed by 15 grains twice a week for ten weeks. If the blood was not clear at the end of treatment the course was repeated. At the end of ten years, he examined 100 native adults and 50 children, selected at random, with the result that parasites were found in 32 per cent. of the adults and 52 per cent. of the children. Furthermore, statistics kept by the Germans showed no diminution in malaria incidence during this period, either among the European or the native population. He concludes that the administration of quinine will reduce sickness and incapacity among the residents, but will not reduce the number of infections; though mostly free from actual fever the population will still suffer from the sequelae of the disease, the economic status of the poorer classes will still be subject to the handicap of a lowered physique, and new arrivals in the district will still become infected. In short, "one cannot escape the conclusion that to rely on quininization to reduce to any marked degree new infections in South African malarial areas is to lean on a very broken reed; on the other hand, the curative administration of quinine—under sufficiently expert supervision—is an invaluable measure in reducing incapacity from the disease and particularly in preventing mortality." He proposes the formation of a Malaria Division in the Public Health Department, which should select a few malarious areas and there inaugurate demonstration campaigns to show the public what to do, and how to do it cheaply and effectively with the means at their disposal. At the same time the Division should carry out propaganda and the treatment of the sick. The lines suggested are species sanitation—a campaign directed exclusively against the carrier species of the district—and the investigation of plasmoquine as a sterilizer of gametocyte carriers.

W. F.

Hughes (T. A.) & Shrivastava (D. L.). **Studies on the Enlarged Malarial Spleen. Part I. Effect of Adrenalin on the Blood Picture. Part II. Effects of Intravenous and Oral Administration of Quinine on the Blood Picture.**—*Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 651–655. [18 refs.]; pp. 657–665. With 2 text figs. [16 refs.] [King Edward Med. College, Lahore.]

I. A subcutaneous inoculation of adrenalin was given to three normal persons, and to ten with enlarged spleens. About twenty-five minutes later, there was a large increase in the white blood cells (12 to 42 per cent.) especially in the large lymphocytes and large mononuclears. The red blood cells were also increased, but in some of the malaria patients this increase was much less than in normal persons.

II. The intravenous injection of 6 grains of quinine hydrochloride produced similar changes in the blood of non-malarious patients, but in seven with enlarged spleens there was a fall in the number of red cells, and a subsequent increase in the bilirubin of the plasma which led the authors to conclude that some blood destruction had occurred.

Three patients were given 10 grains of quinine by the mouth and

films were examined daily. Within four or five days the red cells had increased by 6 to 15 per cent., and the white cells by about 50 per cent. Alkalis were given with the quinine.

W. F.

Reynolds (D.). **Forenote on an Alternative Method for the Administration of Quinine in the Treatment of Malaria.**—*Jl. Roy. Army Med. Corps.* 1930. Apr. Vol. 54. No. 4. pp. 296–298. [1 ref.]

The author recommends that quinine should not be given at fixed hours, but that the hour of the attack should be carefully noted and a dose of 15 grains given two hours before the next paroxysm is due; the object being to secure a maximum concentration in the blood at the moment when the vulnerable merozoites are free in the plasma. He gives two further doses at four-hourly intervals, and then no more until two hours before the next attack is expected. [The administrative difficulties of such a method are almost insuperable, especially where large numbers have to be treated.]

W. F.

Schilling (Claus). Wie wirkt das Chinin auf die Malariaparasiten? [**How does Quinine act on the Malarial Parasites?**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 66–68 (150–152). With 2 text figs.

Three days after therapeutic inoculation of two cases of general paralysis with a benign tertian strain, whilst the temperature was still normal but with some schizonts present in the blood, 1 gm. of quinine was given intramuscularly. The parasites disappeared from the blood on the fourth day in the two cases, the temperature rose to 37·7 and 37·8° C., and on the fifth day to 38·8 and 39·7 C., after 36 hours it sank to normal and remained so. Many authors consider that quinine acts indirectly by mobilizing the natural immunity processes of the human body. The view that antibodies plus quinine are the active agents appears to be negatived by the author's observation. That antibodies should be developed 3 days after inoculation and the production should be hastened and fortified by quinine is contrary to experiences on antibody formation after inoculation of other antigens. Quinine has no effect on the initial fever so frequently observed in therapeutic inoculations; this agrees with the author's view that this initial fever is produced by lysis of the injected schizonts.

E. D. W. Greig.

Herrmann (O.) & Korobkina (W.). Versuche der intrakutanen Malariabehandlung. **Treatment of Malaria by Intracutaneous Injections.**] *Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Feb. Vol. 34. No. 2. pp. 123–128. [11 refs.] [State Inst. for Med. Research, & Central Malaria Station, Kazan.]

The authors treated 24 cases of chronic malaria without parasites in the peripheral blood and a few acute cases with parasites by this

method. They limited themselves to a ¼ to ½ per cent. solution of quinine bihydrochlor., as the stronger solutions caused necrosis and pigmentation of the skin. The amount injected at a time was 0·2 cc. They conclude that in acute cases quinine gives distinctly better results when given by mouth than intracutaneously, but in chronic cases, especially those who have had a good deal of quinine by mouth, the intracutaneous method is useful. They point out that if the intracutaneous method proves satisfactory on further trial it will mean a very great economy in quinine. They consider that, as the dose of quinine by this method is so small, a direct parasiticidal action can be excluded, and the quinine acts probably by the inflammatory reaction stimulating antibody production.

E. D. W. Greig.

Borchardt (W.). Die Wirkung der Chininprophylaxe auf die Magenfunktionen (experimentelle Studien an Tieren). [**Studies on the Action of Quinine Prophylaxis on the Functions of the Stomach by Animal Experiment.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Mar. Vol. 34. No. 3. pp. 164–166. [4 refs.] [Inst. for Ship & Trop. Diseases, & Physiol. Inst., Univ. Hamburg.]

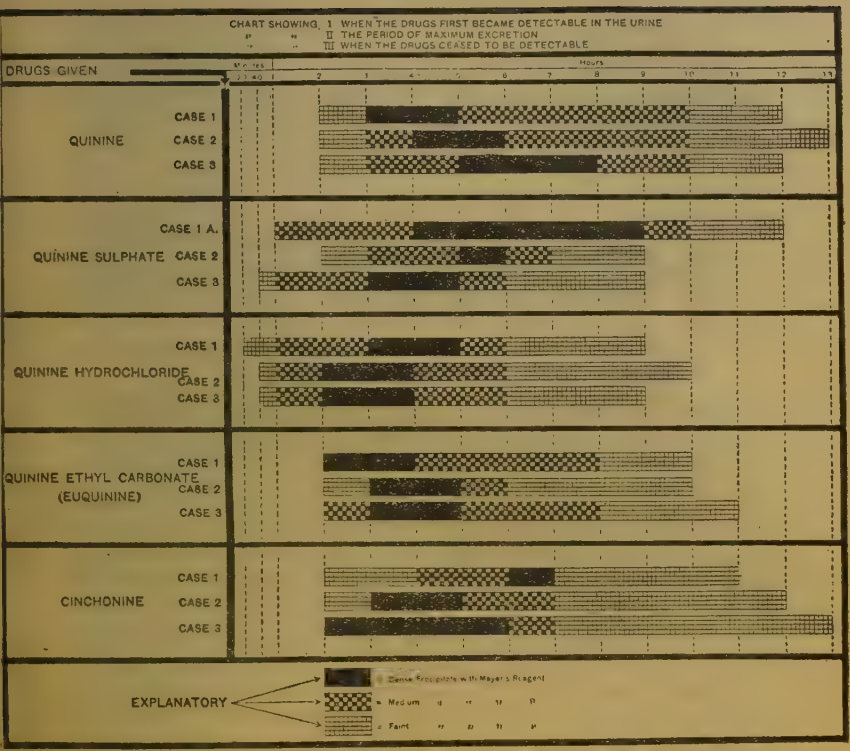
The experiments were carried out by duodenal fistula in dogs. A fixed diet was given throughout. The quantity of gastric juice flowing from the canula was estimated before administration of quinine. Full doses of quinine (0·25 gm.) were given, by mouth in some experiments and intravenously in others. The author concludes that the administration of quinine to dogs has no essential influence on the activity of the stomach, and it is immaterial whether the quinine is taken before or after food. He points out that this observation requires confirmation in the human subject.

E. D. W. Greig.

Green (Richard). **Notes on the Detection in the Urine of Some Drugs used for the Treatment of Malaria.**—*Indian Med. Gaz.* 1929. Nov. Vol. 64. No. 11. pp. 614–618. With 1 chart. [6 refs.] [Inst. for Med. Research, Kuala Lumpur, F.M.S.]

The author administered the insoluble drugs euquinine, quinine base, and cinchonine, and also the soluble sulphate and hydrochloride of quinine, to three healthy persons of different nationalities. The drugs were given in powder form, and were followed by a drink of water. Subsequently the urine was examined for alkaloids by the addition of 15 drops of Mayer's reagent to 10 cc. of filtered urine. (Mercuric chloride, 6·8 gm. ; Pot. iod., 24·9 gm. ; water, 500 cc.). The results are shown in the following diagram. In all cases, the alkaloid appeared 20 to 120 minutes after the drug had been swallowed and it disappeared in 9 to 13 hours. The alkaloids generally took about three times as long to appear when they were given in an insoluble form.

The absorption of plasmoquin was investigated on similar lines by Schulemann's chloranil test (see this *Bulletin*, Vol. 25, p. 568). The small doses in which this drug is employed render its detection difficult. The amount present in small samples of urine was insufficient to give the colour reaction ; it was necessary to extract several hundred cc. of urine with ether in order to detect it, and therefore the total amount



Results obtained with Mayer's reagent for detection of cinchona alkaloids in the urine of healthy persons after administration of drugs used in treatment of malaria.

[Reproduced from *Indian Medical Gazette.*]

of urine passed during eight-hour periods was tested. Plasmoquin was present in the urine passed during the first eight-hour period, but not after.

W. F.

WAMPLER (Fred J.). **A Preliminary Report on the Early Effects of Plasmochin on** *P. cathemerium.*—*Arch. f. Protistenk.* 1930. Vol. 69. No. 1. pp. 1–6. With 11 coloured figs. on 1 plate. [9 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

Canaries were inoculated with the parasite of bird-malaria, *P. cathemerium*, and treatment with 0·1 mgm. of plasmochin was begun about 48 hours after the appearance of parasites. The drug was given in solution through a bent oesophageal tube attached to a tuberculin syringe. Its effects appeared to be the same whether it was given immediately after segmentation or five hours before. The merozoites entered the blood cells as usual, but, 3 or 4 hours later, it was seen that many of the parasites were

poorly developed and stained feebly ; vacuoles appeared in the cytoplasm, the chromatin was more prominent than usual, and soon, nothing remained of the parasite but its pigment. Contrary to expectation, the trophozoites disappeared more quickly than the gametocytes. " The avian parasites are intra-cellular ; the place where the digested parasite had been, remains for a short time as a vacuole in the cytoplasm of the red cell. If the parasites were on the outside of the cell, it would not be possible for them to displace the cytoplasm in this way." [See AKASHI, below, p. 665.]

W. F.

SINTON (J. A.), SMITH (S.) & POTTINGER (D.). **Studies in Malaria, with Special Reference to Treatment. Part XII. Further Researches into the Treatment of Chronic Benign Tertian Malaria with Plasmoquine and Quinine.**—*Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 793–814. [52 refs.]

——. **Part XIII. Parosan and Dimeplasmine in Treatment.** —*Ibid.* pp. 815–820. [1 ref.]

i. An interesting point in this paper is the suggestion that different samples of plasmoquine may differ in toxicity. Seventeen robust young soldiers had been under treatment for several days without mishap when it became necessary to employ a new supply of the drug which had been obtained locally, with the result that eleven of them soon went down with toxic symptoms. The authors suggest that plasmoquine may deteriorate under certain conditions, although a sample of the local supply submitted to the makers was reported to show no increased toxicity. The doses given were 0·06 grams of plasmoquine and 20 grains of quinine daily. [Possibly the cumulative action of the plasmoquine may have been responsible.] The authors consider that certain races, such as Northern Europeans, may be particularly susceptible to the toxic action of the drug. Apart from racial and individual susceptibility, they suggest that a temporary metabolic disturbance, such as liver insufficiency, may determine a toxic effect during treatment. In a group of 48 patients undergoing a three-weeks' course of treatment, with 0·04 grams of plasmoquine and 20 grains of quinine daily, toxic symptoms occurred in 12. In some instances, the symptoms occurred after the drug had been discontinued.

Cyanosis and epigastric pain were the commonest early symptoms, but sometimes there was sudden severe vomiting, abdominal cramp, jaundice, albuminuria and collapse. As the results of their enquiry, they conclude that the combination of quinine with plasmoquine is better than either drug separately, in the production of a permanent cure in chronic benign tertian malaria, that the daily dose of plasmoquine should not exceed 0·04 grams, and that the daily dose of quinine given with it should not be less than 20 grains. They consider that plasmoquine should not be issued except under the constant supervision and control of the medical profession, until a safe dosage and method of treatment has been found.

ii. Seven chronic benign tertian cases were treated with dimeplasmine. It was not possible to arrive at any conclusion from the results, but its value in clearing parasites from the peripheral blood appeared to be almost the same as that of plasmoquine. [Major Sinton seems to have missed the account of GREEN'S investigations, in which dimeplasmine was found to have no effect, either on the parasites or on the symptoms. (See this *Bulletin*, Vol. 26, p. 931.)]

Parosan oxide was supplied by Messrs. May & Baker, who gave its composition as 8-acetylamino 3 hydroxyl 1 : 4 6-arsenious oxide. One patient with subtertian, and five with chronic benign tertian malaria, were given 6 to 9 grams daily for 14 days. The subtertian case relapsed on the tenth day of treatment; one of the benign tertian cases relapsed on the day after treatment was stopped; another continued to have parasites in his blood while he was taking parosan and it became necessary to give him quinine.

The compound, quinine-parosan, was given to 14 patients with chronic benign tertian malaria. Four were given a dose corresponding to 0·6 grams of parosan and 0·9 grams of quinine; in the other ten, the doses of these drugs were respectively 0·9 and 1·35 grams. All those on the smaller dose, and three out of the ten on the larger doses relapsed within six weeks of the completion of treatment.

W. F.

DE MELLO (Froilano), BRÀS DE SÀ (L. J.) & D'ARBEU (Mariano). Contribution à l'étude du traitement du paludisme par la plasmoquine. [**A Contribution to the Study of the Treatment of Malaria with Plasmoquine.**]—*Giorn. di Batteriol. e Immunol.* 1930. Jan. Vol. 5. No. 1. pp. 25–66. [Med. Chirurg. School, Nova Goa.]

The authors' experience in the use of plasmoquine was the same as that of others who have used the drug. They found that it destroyed all forms of *P. vivax* and *P. malariae* and also the gametocytes of *P. falciparum*. The schizonts of the latter were readily destroyed by giving quinine with the plasmoquine. Very few of their patients showed toxic symptoms, and they were of a trivial nature; nevertheless, they do not think that the drug should be administered without medical supervision.

W. F.

KARAMCHANDANI (P. V.). **Plasmochin Compositum in the Treatment of Malaria.**—*Indian Med. Gaz.* 1929. Nov. Vol. 64. No. 11. pp. 626–629. With 4 charts in text. [Indian Military Hosp., Quetta.]

The author has seen only one case of intolerance in three years experience of plasmoquin. He gives the drug in doses never exceeding 0·02 gm. t.i.d., and always after meals, together with quinine and an ounce of glucose. In one instance, crescents persisted in spite of full doses of plasmoquin, but they disappeared when quinine was given in addition.

W. F.

BIGGAM (A. G.) & ARAFA (M. A.). **Observations on a Series of Cases of Artificially Induced Subtertian Malaria with Special Reference to the Effect of Treatment by Plasmoquine Compound.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Apr. 17. Vol. 23. No. 6. pp. 591–607. [19 refs.]

The authors have made further observations of syringe-borne subtertian malaria among the heroin addicts of Cairo, and they have now seen more than one hundred cases (see above, p. 202). Some of the addicts inoculated the heroin into their own veins: primitive

syringes, such as an eye-pipette with a needle stuck on the end, were often employed, and ordinary canal water was frequently used for making the solution. Severe diarrhoea, often with blood and mucus, was a common symptom in this heroin-malaria; but it readily yielded to anti-malaria treatment. Examination with the sigmoidoscope, in these cases, showed diffuse hyperaemia and swelling of the mucosa, with submucous hemorrhages, and superficial necrosis. Good results followed the treatment of a series of fifty cases with a combination of plasmoquine and quinine. Toxic symptoms were almost absent. Oral administration was found the most suitable. The majority of the patients were given plasmoquine 0·06 gram and quinine sulphate 0·75 grams daily for seven days, followed by four days' rest and three days' treatment repeated over a period of five weeks.

W. F.

Mühlens (P.). Ueber Plasmochin-Erfahrungen. [**On Plasmochin.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 44–50 (128–134). [2 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The author refers to his recent experiences with plasmochin. He confirms the observations that its action is most certain and permanent in the quartan infection. As he has had two relapses whilst the two patients were in hospital he cannot confirm the previous favourable opinion formed in regard to malignant tertian infection. He finds it well tolerated in quinine idiosyncracy and blackwater fever. It acts well in cases of malarial cachexia with very large spleens. It is noted that the unpleasant secondary effects can be greatly reduced by giving doses of 0·01 gm. per 10 kilo. per day. He considers that the chief value of plasmochin will be the elimination of the crescent carrier.

E. D. W. Greig.

Frank (A. W.). Zur Therapie des drohenden Malariaabortes. [**Treatment of Threatened Abortion in Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Mar. Vol. 34. No. 3. pp. 161–164.

The author gives the history of two cases. He considers that quinine should be replaced by plasmochin in the treatment of threatened abortion due to benign tertian malaria and with plasmochin compound in cases due to malignant tertian malaria. He inclines to the view that plasmochin has an inhibiting action on the uterine contractions in incipient abortion.

E. D. W. Greig.

Mayne (Bruce). **Tests on the Effects of Coumarin on the Life of the Mosquito and the Malaria Parasite.**—*Indian Jl. Med. Res.* 1930. Jan. Vol. 17. No. 3. pp. 963–969. [2 refs.]

Willcocks (see this *Bulletin*, Vol. 25, p. 557) attributes the relative immunity of Egypt from malaria to "something in leguminous plants, especially in certain kinds of clover, which makes mosquitoes immune from malaria." The substance concerned in legumes is said to be coumarin. The author confined mosquitoes in jars with absorbent

pads soaked in solutions of coumarin, prepared with crystals obtained locally, and fed them with raisins soaked in the same solution. These solutions, in the strengths employed, did not exert any deleterious effects upon the mosquitoes. Mosquitoes which had fed on malaria-infected birds were exposed to coumarin, but the development of the parasites within the mosquitoes was unchecked. In another experiment, larvae were bred out in water containing coumarin; the adults were kept with coumarin pads for two days and were then fed on infected birds. They were subsequently returned to the vessel containing the coumarin, with the result that the parasites developed normally, and eventually active, typical sporozoites appeared.

W. F.

Goldie (Horatio). Beobachtungen über Myosalvarsan bei Behandlung der Malaria. **Treatment of Malaria with Myosalvarsan.**]—*Wien. Med. Woch.* 1929. No. 45. 16 pp. [24 refs.]

The author concludes that : (1) Intramuscular injections of myosalvarsan have a toxic action on all three species of malaria parasite, and have a specific therapeutic action on *P. vivax*. The general tone of the patient is improved by the slow absorption of arsenic. 20 cases were treated with injections of myosalvarsan. (2) The advantages of myosalvarsan over other salvarsan preparations are the absolute freedom from danger after intramuscular injections, and the greater intensity and prolongation of its action. (3) The combination of one to two injections of 0·3 gm. and a short course of plasmochin is a valuable form of treatment. 15 cases of benign tertian malaria were treated by this method.

E. D. W. Greig.

Nauck (E. G.) & Picado (C.). Malariabehandlung mit Cedrin. (Ein Glykosid der Simaba Cedrón.) [**Treatment of Malaria by Cedrin.**] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Jan. Vol. 34. No. 1. pp. 29–41. With 9 text figs. [1 ref.] [San Juan de Dios Hosp., San José, Costa Rica.]

The tree, *Simaba Cedrón* (N.O., Simarubaceae), is found on the Pacific coast of Nicaragua, Costa Rica, Panama and Columbia. Cedrin is extracted from the dried nuts. The active substance is apparently a glucoside. A 10 per cent. solution of the product is put up in ampoules and sterilized by autoclaving. On account of its unpleasant taste it is not suitable for oral administration and the parasites did not disappear from the blood after this method of administration. Better results were got by intramuscular and intravenous injection. The presence of casts in the urine indicates that the drug has a toxic action on the renal epithelium ; the urine must be examined daily. The authors have not been able to obtain conclusive information as to relapse after treatment since the majority of their 17 patients were not seen again after leaving hospital. They conclude that Cedrin appears to be an active malarial remedy and is of interest because it belongs to the glucosides.

E. D. W. Greig.

Cacciapuoti (Giovanni). La riattivazione della malaria con la tubercolina. [**Reactivation of Malaria by Tuberculin.**]—*Riforma Med.* 1930. Feb. 17. Vol. 46. No. 7. pp. 255–256.

The author divided his cases into three groups: 1. Those who had already undergone prolonged treatment for malaria, who were believed to be cured, clinical and blood examinations yielding no signs, but in whom it was desired to know whether the cure was complete. 2. Those suspected of being malarious, but showing no signs clinically or in the blood. 3. Insufficiently treated patients. He injected them with 0·75–1 mgm. of carbolized Old Tuberculin. The first group gave no reaction; some of the second gave a typical febrile reaction with parasites in the blood; in the third group nine out of ten proved positive.

He concludes that injection of tuberculin is valuable from two points of view: First, in bringing to light latent malaria and so aiding diagnosis; secondly, in enabling cure to be accomplished on the old dictum of "No cure of latent malaria unless reactivated."

H. Harold Scott.

Murray (G. E.). **Notes on the Use of Diémènal in Malaria.**—*Jl. Trop. Med. & Hyg.* 1930. Feb. 15. Vol. 33. No. 4. p. 57.

Three cases in which the blood was "strongly positive" were each given six injections of Diéménal. There was no fever afterwards and the author is of opinion that "the preparation is undoubtedly worth trying."

[In the advertisement issued by the makers, Diéménal is said to be "Colloid Manganese," obtained by the electric process. It is said to be "superior" to quinine administered alone, and notes of half-a-dozen cases are given in support of this statement.]

W. F.

Cacciapuoti (Giovanni). L'uso del cacodilato di sodio ad alte dosi nella cura della malaria. [**Cacodylate of Sodium in Large Doses in the Treatment of Malaria.**]—*Riforma Med.* 1930. Mar. 24. Vol. 46. No. 12. pp. 452, 455–456. [3 refs.]

The author treated ten cases of benign tertian malaria, eight of mixed infection, and one each of quartan and malarial cachexia according to the following scheme, using cacodylate of sodium in a strength of 0·25 gm. per cc. distilled water. [See note, p. 211, above.]

H. Harold Scott.

Eustatziu (G.) & Ionesco (V.). Contribution à l'étude de la pathogénie de l'accès de malaria et conclusions qu'on en peut tirer pour la malariothérapie. [**Study of the Pathogenesis of the Malarial Paroxysm.**]—*Arch. Roumaines Path. Expérim. et Microbiol.* Paris. 1929. Sept. Vol. 2. No. 2/3. pp. 325–338. [Serolog. Inst., & Central Hosp. for Mental Diseases, Bucharest.]

The authors found it difficult to treat Rumanian patients by the Wagner von Jauregg method because so many of them were immune to malaria; 44 per cent. of the peasants and 10 per cent. of the town-dwellers proved to be refractory to the inoculation of 5 to 10 cc. of infected blood and, in those who were susceptible, the incubation was irregular, uncertain, and sometimes prolonged. These difficulties

were overcome by the intravenous transfusion of large quantities of blood. A Jubé apparatus was employed for the purpose, and all the usual precautions were taken with regard to blood grouping and asepsis. The transfusion of 200 to 250 grams of infective blood was invariably followed by success, and the long incubation period was abolished. The malarial paroxysm occurred at about the same time in the recipient as in the donor; it took place simultaneously in both if the transfusion was made during or shortly after a paroxysm in the donor, or if it was made twelve to twenty-four hours before one; otherwise the recipient's attack was a few hours later than the donor's. A quartan strain was employed, one which had been maintained by direct inoculation from man to man through many passages.

W. F.

Hecht-Eleda (Margot). Zur Frage des Fiebertypus der Impfmalaria. [**Type of Fever in Inoculation Malaria.**]—*Wien. Klin. Woch.* 1930. Mar. 27. Vol. 43. No. 13. pp. 399–400. [8 refs.]
[I. Clinic for Dermat. & Syph., Univ., Vienna.]

The author notes that in cases of general paralysis inoculated with benign tertian malaria the fever generally runs a quotidian course. Patients in the clinic suffering from syphilis in various stages and inoculated with malaria were studied as regards the course of the fever, 285 cases in all. All were inoculated intravenously with 3 to 5 cc. of blood. 247 showed a regular tertian type of fever, the highest point being fairly constant, ranging between 40° and 41° C. On an average nine rigors were allowed for the treatment. The greater frequency of the tertian type of fever in this class of case as compared with that in general paralysis is, in the opinion of the author, largely dependent on differences in the condition of the patients.

E. D. W. Greig.

Ioff (I.). Zur Morphologie der Parasiten der Malaria tropica (*Plasmodium immaculatum* Grassi u. Feletti 1891). [**Morphology of *Plasmodium falciparum*.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. Apr. 26. Vol. 116. No. 4/5. pp. 225–241. With 33 coloured figs. on 1 plate. [82 refs.]

The epidemic of malignant tertian malaria in 1922–1924 in south-east Russia gave the author the opportunity of investigating several hundred cases. From a study of the material he considers that dry blood film preparations are not satisfactory, as the results are not constant, depending chiefly on the duration of the drying; he also thinks that it is still too soon to reach a decision on the question of the varieties of the malarial parasites, and he further notes that too little attention has been paid to the question of biological variability of the malarial parasite.

[Brumpt gives as a synonym of *Plasmodium falciparum*, *Plasmodium immaculatum* Schaudinn, 1902, not, as stated by author, Grassi and Feletti, 1891.]

E. D. W. Greig.

VILLAIN (Georges). Observations tunisiennes de plasmodies atypiques au cours du paludisme grave. [**Observations on Atypical Plasmodia during the Course of Severe Malaria in Tunis.**]—*Arch. Inst. Pasteur de Tunis.* 1929. Nov. Vol. 18. No. 3 & 4. pp. 352–363. With 35 figs. on 1 plate. [7 refs.]

Not all cases of severe malaria show atypical parasites in the blood but, nevertheless, the presence of such forms signifies a grave infection. The blood should be carefully examined in all cases, and should such forms be detected treatment must be vigorously applied, even though the symptoms be mild. The author is of opinion that these atypical forms, which have been called "*tenue*," "*caucasicum*," and so on, are not different species, but simple variations of the three established forms of malaria parasites, especially of *P. falciparum*, due, it may be, to an increased aggressiveness of the plasmodium, or to a decreased resistance of the host, or to both factors combined.

W. F.

WARASI (W.). Einige biologische Eigenschaften der Malariaparasiten. [**Biological Peculiarities of the Malaria Parasite.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Mar. Vol. 34. No. 3. pp. 167–169. [9 refs.] [Inst. for Trop. Diseases, Tiflis.]

The author seeks to answer the question, why does the malarial parasite enter the red cell? He has not confirmed the view that it has a positive chemotaxis for haemoglobin as a food stuff. He studied the parasites, *P. falciparum* and *P. vivax*, in cultures outside the body following the method of Bass. From the experiments he considers that the malarial parasite is a strong aerobe, and enters the red cells on account of their oxygen content. He considers that the degree of saturation of the red cells with oxygen is not so important as the difference in oxygen tension between the red cells and the blood plasma.

E. D. W. Greig.

LAFFONT, BINET & LESINI. Un nouveau cas de paludisme congénital. [**A Fresh Case of Congenital Malaria.**]—*Bull. Soc. d'Obstét. et de Gynécol. de Paris.* 1929. Apr. Vol. 18. No. 4. pp. 296–297.

A primipara who had suffered from occasional attacks of malaria from childhood was admitted to hospital, in labour, with a temperature of 104°. Benign tertian parasites were found in her blood and, at the completion of labour, they were found in the umbilical cord. The infant had a temperature of 101°, twelve hours after birth, which came down after some injections of quinine, but it died on the twelfth day, three days after being removed from hospital.

W. F.

MARGINESU (P.). Tentativi di trasmissione della malaria alla scimmia ed al coniglio. (**Attempts to transmit Malarial Infection to Monkeys and Rabbits.**)—*Riv. di Malariologia.* 1929. Nov.–Dec. Vol. 8. No. 6. pp. 685–693. [8 refs.] [English summary p. 748.] [Hyg. Inst., Univ., Parma.]

The author inoculated young rabbits and monkeys (*Macacus rhesus*) with human blood, rich in sexual and asexual forms of *P. vivax*. An attempt was made to increase the susceptibility of the animals by various means, such

as splenectomy, blocking the reticulo-endothelial system, and haemolytic infection. The blood, examined over periods extending from a few hours to twenty days, never showed any parasites, nor was its inoculation into mental patients followed by malaria.

W. F.

Konstansoff (S. W.). Malariaimmunität, Malariavakzine und Vakzination. [**Malarial Immunity, Malarial Vaccine and Vaccination.**] —*Zent. f. Bakt.* I. Abt. Orig. 1930. Apr. 26. Vol. 116. No. 4/5. pp. 241–256. With 4 charts in text. [25 refs.] [Crimean Pasteur Inst., Simferopol.]

The author prepares his vaccine by withdrawing 10–20 cc. blood from patients suffering from malaria into a 3 per cent. solution of sodium citrate; after mixing, the blood is centrifuged, and then placed on ice, then the plasma is pipetted off, the red cells are lysed with distilled water, and 0·2–0·3 per cent. carbolic acid is added. This is injected into the same patients. The number of plasmodial bodies in the autovaccines used by the author varied from 750,000 to 80,000,000 per cc. He treated 5 cases of *P. vivax* infection with autovaccines. Doses of the vaccine were from 2–5 cc. given subcutaneously in the apyrexial period at intervals of 10 hours to 5 days. From observations on the changes in morphology of the parasites following the injection of the vaccine he considers that immunity to malaria is gradually established.

E. D. W. Greig.

Andriadse (N.). Zur Frage des Kalium und Calciumgehaltes in dem Blutserum der Malariakrankan. [**Potassium and Calcium Content of Serum in Malaria.**]—*Nachrichten der tropischen Medizin.* Tiflis. 1929. Vol. 2. No. 9–10. [In Georgian script. German summary p. 704.]

The potassium and calcium content of the serum was determined in 49 malarial patients (26 benign tertian, 18 malignant tertian and 5 mixed infections). The results showed that the calcium content of the serum in both infections varied very little. The potassium content of the serum was greatly increased during the attack owing to destruction of the red cells, but excretion was rapid, and in the apyrexial period it showed a drop below normal of 34·6 per cent. in the case of benign tertian and 83 per cent. in malignant tertian.

E. D. W. Greig.

James (S. P.). **A Note on the Shute Technique for staining Malaria Parasites with Leishman's Stain and on the Stippling in Infected Red Blood Corpuscles which it reveals.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Nov. 25. Vol. 23. No. 3. pp. 269–278. With 1 text fig. [24 refs.]

——. **Addendum.**—*Ibid.* 1930. Jan. 30. Vol. 23. No. 4. p. 437.

In this paper, Col. James describes the staining technique employed by Mr. P. G. Shute, Laboratory Assistant in the malaria laboratory of the Ministry of Health. An important outcome of its use has been the demonstration of a hitherto unnamed type of stippling in blood corpuscles infected with quartan parasites, as well as the demonstration of Schüffner's dots and Maurer's spots at an earlier stage than usual.

The slides used in Shute's method are those known in the trade as " half white " ; they should be dipped in nitric alcohol (30 parts nitric acid, 70 parts absolute alcohol), and after being wiped dry, should be kept in absolute alcohol.

The distilled water required for the process is shaken up in a one-litre flask and its pH is determined with a Baird & Tatlock's comparator, No. P.2759. Add three or four drops of a saturated solution of lithium carbonate to the flask and shake. Test the pH again and continue adding a few drops until the water in the flask becomes exactly of an alkalinity indicated by observing that after adding 0·5 cc. of a 0·01 solution of phenol red to 5 cc. of the water, the result in colour matches the tube marked 7·2.

The stain is made up with pure methyl alcohol (" free from acetone "), the reaction of which must be tested before use. A measured quantity is diluted with three times its bulk of the distilled water which has been adjusted to pH 7·2. If the colour, after adding 0·5 cc. of phenol red to 5 cc. of the mixture, matches the standard tube 7·0, the methyl alcohol is quite suitable. If, however, the mixture is more acid than this, add more lithium carbonate to the distilled water until it reaches a pH of 7·4. Test a mixture of this water and the methyl alcohol as before. If the resulting colour now matches tube 7·0, the alcohol may be regarded as suitable when used with a 7·4 water. Any brand of methyl alcohol not complying with the second test should be discarded.

To make up the stain, rinse a glass-stoppered bottle, made of hard green glass, with the methyl alcohol ; put in 0·15 gm. of Leishman's crystals ; add 100 cc. of the methyl alcohol ; shake occasionally for the next 24 hours. The stain will then be ready for use. Do not use a pestle and mortar, do not filter.

To stain a blood film, drop four drops of the staining solution on the film, rock for ten accurately timed seconds, then add twelve drops of distilled water and mix thoroughly by tilting and rocking. Cover the slide with a Petri dish, and allow it to stain for 30 minutes. Although the older stages of the parasites will be too deeply stained, that period is necessary to bring out the quartan stippling and the Schüffner's dots and Maurer's spots in the very young stages.

On the termination of staining, a good stream of distilled water must be applied at once so that all stain and deposit is flushed off in the first moment. Washing in the stream of distilled water should be continued for 15 seconds by the watch.

Schüffner's dots are relatively large, round, numerous, and very distinct. The quartan stippling consists of dots and points, smaller and less distinct than Schüffner's dots. While Schüffner's dots can be stained in five minutes, quartan stippling is not demonstrable until after twenty minutes. Maurer's spots are larger, more irregular in shape, more darkly stained, and less numerous than the dots in either of the other types.

In English text-books Maurer's dots are wrongly named " Stephens' and Christophers' dots." Schüffner first described them in 1899; his friend Maurer in 1900 and 1902 confirmed and extended Schüffner's results by using Romanowsky stain in place of the Mannaberg and haematoxylin stains used by Schüffner. Col. James considers that Ziemann has the right of priority of observation and of description of the stippling associated with quartan parasites, and he suggests the title " Ziemann's stippling " to describe it. He believes that the *Plasmodium ovale* described by Stephens (see this *Bulletin*, 1923, Vol. 20, p. 296) was really a quartan parasite in a cell where the staining process happened to bring out the stippling.

Stippled red corpuscles not containing parasites are common in films from cases of subtertian malaria stained by the Shute technique, and they also occur, but less frequently, in films from cases of quartan malaria. [It will probably be necessary to modify this technique, if it is employed in hot countries, in order to prevent the stain from drying on the slides.]

W. F.

James (S. P.) & Kauntze (W. H.). **Malaria Parasites in Kenya and Uganda.**—*Kenya & East African Med. Jl.* 1930. Mar. Vol. 6. No. 12. pp. 338–346. With 1 coloured plate facing p. 337. [2 refs.]

The authors state that the changes in infected blood corpuscles which can be brought out by careful staining, afford the best assistance to the specific determination of the parasites, and this paper is largely a summary of the Shute method of staining blood films (see James above).

The following formula is recommended for thick films :—

Azur II eosin (G. Grubler)	0·60 gram.
Azur II	0·16 gram.
Methyl alcohol	75·00 cc.
Glycerine (chemically pure, anhydrous)	25·00 cc.

Price's redistilled glycerine, or Merck's Bidistillata, is recommended. The stain should be diluted for use, in the proportion of 1 drop to 1 cc. of distilled water. Thick films should be allowed to dry without artificial heat, and should be stained for two hours without preliminary dehaemoglobinization.

A study of the characters of subtertian parasites in Kenya is considered especially needful, because it is uncertain that the usual text-book description of *P. falciparum* fits them exactly ; Ziemann contends that the African parasite (*P. perniciosum*) differs in essential respects from the Italian form (*P. falciparum*).

W. F.

Akashi (K.). **Study of Malaria Parasites by Aid of Supervital Staining.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1930. Feb. No. 299. pp. 4–5. [Govt. Hosp., Tainan.]

The author used Nile Blue, Brilliant Cresyl Blue and Neutral Red for the supervital staining of malaria parasites. The parasites were seen to consist of two portions, one which stained well, and another which was highly refractive and did not stain at all. The latter portion was twice the size of the stainable portion, and either surrounded it or was situated on one side of it. The parasites were elliptical or round, they did not assume the ring form observed in dried films. They appeared to lie on the surface of the corpuscles.

W. F

Garin (Ch.). Recherches sur le sang des paludéens. [**Researches on the Blood of Malaria Patients.**]—*Rev. Prat. Malad. des Pays Chauds.* 1930. Feb. Vol. 10. No. 2. pp. 55–62. [1 ref.]

The author found that anisocytosis was common in the anaemia of malaria, some erythrocytes measuring as much as 12 or 13 μ, while others were only 4 or 5 μ in diameter. Nucleated red cells were found in only 2 out of 4,000 films. [This is not the experience of all workers in the tropics.] The number of red cells varied between extreme limits of 895,000 and 6,240,000. The haemoglobin index was practically normal. The number of erythrocytes destroyed in a paroxysm was found to be 200,000 per cmm. ; this figure was constant, and quite independent of the number of parasites. The reduction of red cells took place not only during the attack but also during the evolution of paludism. The number increased rapidly under treatment and sojourn at a high altitude. It was found that, contrary to expectation, malaria did not increase the fragility of the red cells, but augmented their resistance, and the infected corpuscles were no more

fragile than their non-infected neighbours. The number of leucocytes did not vary with the number of erythrocytes and was found to be a little above the normal, particularly during the attack. There was a relative mononucleosis and eosinophilia most marked in the intervals, but, just before a paroxysm, there was a great increase in the number of neutrophiles which diminished during the attack. As the intervals between the attacks became longer and the patient improved, the number of neutrophiles increased. Arneth's counts, made in 72 cases, showed a shift to the left.

W. F.

HUPPENBAUER (C. B.). Unsere Erfahrungen mit der Malaria der Versorgungsberechtigten. [**Malaria amongst Germans entitled to Relief.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Vol. 33. No. 3. pp. 35–41 (119–125). [1 ref.]

The author discusses the problems connected with disabilities amongst persons entitled to relief and who were said to have contracted malaria during the war. He indicates lines for dealing with such cases. An interesting dicussion followed, in which a number of speakers took part. MANTEUFEL gave his personal experience of war malaria contracted in East Africa. The last occasion on which parasites were found in his blood was in 1923, but the malaria still gives rise to symptoms.

E. D. W. Greig.

MALARIA (CORRESPONDENCE).

STRICKLAND (C.) assisted by CHOUDHURY (K. L.) in collaboration with others. **A Report on a Mosquito-Malaria Survey of the Duars Tea Gardens. Including a Note on the Anopheline Larvae found in Borrow-Pits** by S. KINGSLEY-WARD **and Some Factors in the Epidemiology of Blackwater Fever in the Duars** by Oliver McCUTCHEON.—pp. iv+145. With 3 figs.

"In the November number of the *Bulletin of Tropical Diseases* [*sic*] your reviewer apparently questions the tenour of a statement in a 'Report on a Mosquito-Malaria Survey of the Duars Tea Gardens' to the effect that those living under comparatively good conditions 'are as seriously affected by malaria as the labourer' and complains that no figures to support the statement are supplied.

"Now the probable reason why figures were not given is that they were not available, separate statistics for European morbidity and mortality in the tea districts not being published, and the usual endemic indices, of course, being useless on account of the scanty population. But even if the figures were published they might do but little to prove the truth of the statement, because of particular conditions only within the ken of those cognisant of life in the tea-districts. We here mention one or two of these circumstances.

"With regard to European sickness, those seriously ill from any cause are, if possible, sent to Calcutta or Home. The mortality rate of such cases then would not come on the local register.

"The European population is comparatively very small and mostly comprised between the ages 20 to 55, families usually consisting of the parents with only one or two children, who are sent Home at about six years of age. No comparisons of mortality in children of different types of nurture is therefore possible, and it is on the children that malaria levies the heaviest toll. European children in a malarial district require continual dosing with quinine to keep them even moderately healthy, and they have the advantage that the medical officer is in a position to give the individual care demanded.

" The European planter can usually be convinced of the necessity for a course of quinine, whereas there are few of the Indian clerks or coolies who will continue taking quinine when an attack of fever is over. This gives the European another advantage.

" Therefore, figures, if available, would give a very partial view and estate practice in Assam for over 20 years leads me firmly to agree that those living in comfortable circumstances appear to be equally liable to infection, and, if not properly treated, run the same chances of death or ill-health as the labourer living in a hut and subsisting on little but rice.

" Your reviewer also asks if the amelioration of the coolies' lot has not been worth while even if it has not reduced his malaria rate. The author's object, however, was obviously only the discussion of antimalarial measures, so that this question does not properly arise."

R. A. Murphy,
Medical Officer,
Luskerpore Valley Medical Association,
Sylhet, Assam.

Reply to Dr. R. A. Murphy's letter.

" The sentence in Professor Strickland's report, to which Dr. Murphy refers, and which I think ought to have been supported by statistics, is as follows : ' the well-housed, highly-paid, and pampered planter, and the bloated babu are as seriously affected as the labourer.'

" Dr. Murphy does not appear to distinguish between being ' infected ' and being ' seriously affected.' His twenty years' experience has convinced him that the European is as liable to infection as the native, and Professor Strickland has found the spleen index of the latter as high as it was 20 years ago. On the other hand, one gathers from Dr. Murphy's letter that the European is not so ' seriously affected ' as the native, that is to say he does not run the same risk of death or ill-health, and this is because he is sent out of the country when he gets ill, because he is better educated and because he receives more efficient medical treatment—in short, because he is ' pampered.' In the last seven years there has been no case of blackwater among the members of the European staff. The native, too, judging from a recent article by Dr. Murphy (see this *Bulletin, ante,* p. 197), is less ' seriously affected ' than in the old days of squalor and neglect ; though the spleen rate is about 80 per cent., the effects of this high rate of infection are less severe than would be expected."

William Fletcher.

LEPROSY.

Leprosy Review. 1930. Apr. Vol. I. No. 2. 32 pp. With 1 text fig. Quarterly Publication of the British Empire Leprosy Relief Association, 29, Dorset Square, London, N.W. 1.

The most important article in this number is one by H. W. Wade on "Evolution of the Campaign in the Philippines." In this the reasons are given why "the plan of the anti-leprosy campaign in the Philippine Islands has undergone decided change in the past few years."

In 1901, when compulsory segregation was decided on, it was the only available method of controlling leprosy and the great Culion settlement for 5,000 cases was opened in 1906. "When all the known lepers had been transferred to Culion it was expected that the incidence of leprosy would decline rapidly thereafter, an expectation which did not materialise. This was largely owing to the fact that the health officials failed to realise that there would be remaining a large number of hidden or undetected lepers as a result of such measures. . . It is known that in a period of fifteen years the average number of cases segregated annually did not decline materially. . . A new era commenced in 1921 when, after preliminary small-scale trials, the new treatment work was systematically started at Culion. . . It is perhaps difficult for any who have not experienced it themselves to realise just how great is the difference that the advent of a comparatively successful treatment has made in the whole situation. Once the superior effectiveness of the new treatment was determined it became possible to modify the campaign plan." Thus, when the public realised that a number of patients "were really being cured (or, if it be preferred, 'apparently cured') " lepers began to come voluntarily, and several hundreds now come each year. "Regional treatment stations" were now opened at Manila and Cebu and will be increased, where many hundreds of comparatively early cases are now being treated successfully without ever being sent to Culion. A second phase of the new campaign is the search for early cases and the opening of "a special skin clinic" at Cebu where early cases have been treated with success as out patients during the last two years, and these are now being extended. "The results that are obtained at Cebu are very encouraging as to the possibilities of dispensary treatment for the comparatively easily cured incipient cases." The new system, then, comprises "segregation of the infective cases, attraction of such cases by the treatment and to some extent by local rather than distant segregation, dispensary treatment of the incipient cases, and intensive survey and educational work in the field." It is proposed gradually to extend this system region by region and "there is much more hope than ever before of seeing leprosy eradicated, or at least reduced to comparatively unimportant proportions."

This pronouncement has been given largely in the writer's own words in view of its importance to countries still enforcing unmodified compulsory segregation of all discovered lepers.

N. Paytoff contributes an instructive article on leprosy lesions in the nose and mouth; in this he advocates painting with Pot. iod. 0·6 gm., iod. cryst. 0·2 gm. and glycerine 30 cc. in the initial stage and for ulcers in the nose, while in limited affections still better results are obtained by painting with a solution of 5 per cent. chromic acid or 50 per cent. lactic acid. The chromic acid solution led to rapid healing of the ulcers.

The remaining articles are mostly reviews of already published work; they include leprosy in Norway by Dr. Lie, the value of the sedimentation test in leprosy treatment by Dr. Isabel Kerr, work on

the Gold Coast by Dr. DIXEY, and the treatment by alepol and by Martindale's sodium gynocardate, which indicates a superiority of the former.

L. Rogers.

ROGERS (Leonard). **Recent Advances in the Treatment and Prophylaxis of Leprosy.**—*Edinburgh Med. Jl.* 1930. Jan. Vol. 37. No. 1. pp. 1–27. [88 refs.]

This account of recent advances in the treatment and prophylaxis of leprosy was the subject of the Cameron Prize Lecture delivered at the University of Edinburgh in October, 1929.

The author considers in turn local treatment, as by carbon dioxide snow and trichloracetic acid, and next the use of vaccines and the results obtained from protein shock, methods which are not fundamentally separable when non-specific bacillary emulsions are employed. Of organic substances, naturally those considered in most detail are chaulmoogra and its derivatives—the gynocardates, hydnocarpates, ethyl esters, alepol, etc.—the history of their evolution, a brief account of their modes of employment and the results obtained being presented.

An interesting section of the lecture dealing with the "chemotherapy and mode of action of the chaulmoogrates and hydnocarpates" will help greatly in clearing the way from empiric to rational treatment of the disease.

Lastly, the advantages of voluntary clinics and relaxation of segregation in early non-infective cases, which the author has strongly advocated for years against not a little opposition, and the benefits of which are now becoming generally recognized, are again summed up at the conclusion of the lecture.

As a reasoned and well-balanced statement of what is known regarding the treatment of leprosy at the present day, the lecture is not only interesting and instructive but sounds a useful and, indeed, much needed note of warning to those who are inclined to publish favourable and unduly optimistic reports on some new alleged remedy after too short a period of trial and observation on too small a number of cases.

All those engaged in treating leper patients would benefit from a study of this clear summary. A full list of references is appended.

H. Harold Scott.

i. SOUTH AFRICA, UNION OF: **Annual Report of the Department of Public Health Year ended 30th June, 1929** (MITCHELL (J. Alexander), Secretary for Public Health & Chief Health Officer).—Leprosy pp. 27–34.

ii. ROGERS (Leonard). **Leprosy Policy. A Reply to Dr. Mitchell's Criticism of my Views on Compulsion Prophylaxis in South Africa.**—*Jl. Med. Assoc. South Africa.* 1930. Feb. 22. Vol. 4. No. 4. pp. 93–94.

i. Dr. J. A. Mitchell, in the former of these papers puts forward his views on the compulsory segregation of lepers in strong opposition to those of Sir Leonard ROGERS, supporting his statements by the opinion of Dr. Cecil COOK on the measures suggested by him for dealing with the disease in Australia.

ii. To Dr. MITCHELL's strictures Sir Leonard Rogers replies stating that the former had misunderstood or misrepresented his views. Though opposed to a rigid system of wholesale compulsory segregation, he did *not* advise abandonment of the plan in countries where much money had been expended for this purpose, but he was of the opinion that it should be modified so as to prevent the harm resulting from concealment of the disease owing to fear of such segregation. He points out the necessity for attracting and treating patients in an early stage in order to effect a cure and lays stress on the fact that the use of injections of pure derivatives of the active constituents of hydnocarpus oil is far superior to the older method of oral administration of the oil in bringing about improvement, rendering non-infective and even curing a certain proportion of cases. The combination of early discovery and thorough treatment on modern lines should in course of time, " about two decades," render compulsory segregation unnecessary.

H. Harold Scott.

LEPROSY IN INDIA. 1930. Jan. No. 1. 36 pp. With 2 maps; & Apr. No. 2. 81 pp. With 2 plates (1 map). Issued quarterly by the Indian Council of the British Empire Leprosy Relief Association.

This new journal is described as " A record of the Progress of Anti-Leprosy Work in India, with Notes on Methods used in other Countries." It is another tribute to the increasing interest in the subject since an effective treatment of the disease was discovered a little over a decade ago. The first number includes leprosy surveys in the East Godaveri District and in the Nizam's dominions, which confirm the presence of several early cases for each advanced census returned one, and they have resulted in the establishment of new clinics in these areas. Oral sepsis in lepers is dealt with by Dr. Isabel KERR, and the cause of painful injections by Dr. E. MUIR. Reports on provincial branches and reviews of published work complete a useful number.

In No. 2 Dr. I. KERR deals with thyroid extract in the relief of symptoms of hypothyroidism; N. CHOWSKY with leprosy in the Bombay Presidency, where the disease is widespread in the villages, to deal with which an ambulatory service during the dry season is advocated; and E. MUIR describes the technique of intradermal injections. Reviews of recent work and reports from six treatment centres, mainly of local interest, complete the number. They are printed by the Delhi Printing Works, and can be obtained at an annual charge of Rs. 1, annas 8 (2s.).

L. R.

MAXWELL (James L.). **Leprosy in India.**—*China Med. Jl.* 1930. Jan. Vol. 44. No. 1. pp. 37–45. With 8 figs. on 4 plates. [Henry Lester Inst., Shanghai.]

This is an interesting study of the leprosy problem in India and a comparison with the position in China. The author's first impression was " the complete or almost complete disappearance of the mediaeval notions in regard to the segregation of lepers," due to the researches on treatment by Calcutta workers. The greatest leper settlement at Purulia was overcrowded with in- and out-patients without the

slightest compulsion, in contrast with the fact that "compulsory segregation drives into hiding the early cases which are the ones most amenable to treatment." This is due to the well-founded hope that the disease can now be cured, and practically all cases improve steadily, although the complete elimination of the disease is neither speedy nor easy as yet. The present hopeful outlook in India is in marked contrast to the fatalistic despair in China. A description of the Purulia settlement and of Muir's Calcutta Clinic follows, and the necessity of the Government of China supporting work on similar lines is pointed out.

L. R.

Mayer (T. F. G.). **Distribution of Leprosy in Nigeria.**—*West African Med. Jl.* 1929. July. Vol. 3. No. 1. p. 26. With 1 map.

A very short note with a map of the incidence of leprosy in Nigeria shaded to show the areas in which it is "rare" up to being "prevalent." It is based on a reply to a questionary and further information is asked for. [In a letter to the reviewer Dr. Mayer reports that about 4,000 lepers are now being treated in settlements and at clinics in Nigeria on an entirely voluntary basis.]

L. R.

Siro (Fadda) & Ferruccio (Cotta Ramusino). Distribuzione generale della lebbra in Somalia. Note epidemiologiche e cliniche. [**The Distribution of Leprosy in Italian Somaliland. Epidemiological and Clinical Notes.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Jan. 1. Vol. 11. No. 1. pp. 14–22. With 5 text figs. (1 map). English summary (4 lines) p. 23.

A spot-map gives the distribution and prevalence of leprosy which exists mainly along the coast and the Scebeli River. On this map are shown the places where the disease is believed to have existed in the past and the varying intensities of prevalence at present; it is worst at Gelib, Algoi, and Balad. Macular forms are commonest. There is a leprosarium at Gelib founded in 1927 with 50 inmates, and an agricultural colony capable of maintaining 60 patients is projected for Audegle.

H. Harold Scott.

Tisseuil (J.). Quel a été, à ce jour, l'avenir des guérisons cliniques de la lèpre, en Nouvelle-Calédonie. [**The Outcome of Clinical Cures of Leprosy in New Caledonia.**]—*Bull. Soc. Path. Exot.* 1930. Jan. 8. Vol. 23. No. 1. pp. 63–77. [3 refs.]

Between 1902 and 1928, 34 lepers have been discharged recovered from the New Caledonia institutions, of whom 13 are known to have relapsed, or 38·2 per cent., and since 1921 the relapse rate has been 50 per cent. Cures have more frequently been obtained in the more recent cases within two years of entering the sanatorium, and some persisted after from 1 to 4 up to 20 years.

L. R.

Santiago (Varella). A lepra no Rio Grande do Norte. [**Leprosy in Rio Grande do Norte, Brazil.**]—*Brasil-Medico.* 1930. Feb. 8. Vol. 44. No. 6. pp. 167–171. With 4 text figs.

The first case known or recorded is that of a medical student showing symptoms in 1864 and dying ten years later, and until the beginning of the present century cases were few. In 1926 a leprosarium was established and in the last six months of that year there were 3 inmates ; during 1927 there were 12 more admissions, in 1928 37, and in the first five months of 1929 another 36. Allowing for deaths and discharges there were at this time 88 patients ; 85 were examined for the bacilli in the nasal mucus and 75 were positive. Twenty-six came from the Natal Municipality, 9 from Macahyba, 9 from José de Mipibú, 7 from S. Gonçalo, 7 from Cearámirim, the remainder in ones and twos. Of the 88, 59 were males, 29 females ; the larger numbers, 20, were between 41 and 50 years of age, and next, 19, in the third decade. The majority are said to have contracted the disease in Pará or Amazonas, or from patients who themselves came from these districts.

H. Harold Scott.

Mendioroz (Julio). Historia y censo de la lepra en Salta. [**History of Leprosy in Salta, Argentine.**]—*Semana Méd.* 1930. Jan. 30. Vol. 37. No. 5 (1881). pp. 291–308. With 10 text figs. [14 refs.]

This article is almost entirely statistical. The author, after giving an account of the Province, geographical and meteorological, sketches the progress of leprosy in the eighteenth century and up to 1929. Details are not of much value until he comes to the present century. At great labour he has got together notes of 125 lepers now in Salta, and the number has been increasing of late. During the last 44 years of the nineteenth century 24 cases only were recorded, but in the 29 years of the present century 101 cases, and the number in the last decade is double that of the preceding. The increase is proportionately much in excess of the growth of the population. Since 1869 the population has doubled while leprosy has increased twelve times, and from 1914 the increase in population has raised it to 1·2, the lepers to 3·2. In 67 of the 125 cases their place of infection was determined : Capital 41, Rosario de Lerma 8, Cerillos, Guichipas and Merán 5 each, Orán in the Lerma Valley 3.

H. Harold Scott.

Lampe (P. H. J.) & Simons (Ch.). Lepra in Suriname. [**Leprosy in Surinam.**]—*Nederl. Tijdschr. v. Geneesk.* 1929. Oct. 19. 73rd Year. 2nd Half. No. 42. pp. 4903–4915. With 1 text fig.

The incidence of leprosy in Surinam during the period between 1927 and 1929 was investigated. To attract more patients to the clinics the isolation of lepers was not insisted upon, and gratuitous treatment was offered. The number of registered patients who attended the clinics increased considerably and a fairly accurate estimation of the incidence of leprosy in Paramaribo and surroundings could be made.

At the end of April, 1929, the number of lepers in Surinam was about 1,200, i.e., 9 per 1,000 inhabitants. The incidence is greater amongst males, the predominant age being 10–14 years. The most common

type of the disease is the lepra maculosa. As to treatment, improvement of general hygienic conditions was aimed at and various chaulmoogra preparations were administered, per os, by injection or externally as soap or ointment. The results in a number of cases were very good. Early skin eruptions disappeared in young children after six months of the treatment.

The author noticed that the acute symptoms which occasionally appeared after the administration of chaulmoogra preparations were often followed by an improvement of the patient's condition.

H. Lwow.

DENNEY (O. E.). **The National Leper Home United States Marine Hospital, Carville, La. Review of the More Important Activities during the Fiscal Year ended June 30, 1929.**—*Public Health Rep.* 1929. Dec. 27. Vol. 44. No. 52. pp. 3169–3176.

"The optimism referred to in recent annual reports from this hospital has continued progressively to increase; the hopeful outlook of a considerable proportion of the patients is reflected in both the patients at large and the personnel." This opening statement is borne out by the following details. During the year ending June 30th, 1929, there were admitted 49 new and 9 patients who had absconded. 13 died. 19 were paroled with leprosy arrested and 6 more were fit for parole, but elected to remain owing to deformities. The treatments most used are chaulmoogra oil orally in daily doses of from 9 to 375 drops, and bi-weekly injections of benzocaine-chaulmoogra oil in 5 cc. doses with improvement in nearly all on the latter method. In patients with conjunctivitis and iritis diphtheria antitoxin has been used with favourable results, especially in the relief of pain. In some cases the application of heat from 50° to 52° C. with considerable pressure for two to six minutes daily has caused absorption of lepromata in one to three months. Acid-fast bacilli were found in the sputum of a number of lepers, only some of which proved to be those of tubercle.

L. R.

DENNEY (Oswald E.), HOPKINS Ralph & JOHANSEN Frederick A.). **Recoveries from Leprosy. An Analysis of the Records of Sixty-five Cases.**—*Amer. Jl. Trop. Med.* 1930. Mar. Vol. 10. No. 2. pp. 83–111. With 4 text figs. U.S. Marine Hosp., Carville, La. Also in *Public Health Rep.* 1930. Mar. 28. Vol. 45. No. 13. pp. 667–687. With 5 figs. (4 on 2 plates).

This interesting paper deals with 65 patients released during the last ten years from the Carville leper hospital of the United States. Classification of the cases showed 12 nodular on admission, 26 mixed and 27 nerve, with averages of 5·8, 5·5 and 9 years respectively in hospital. In 55 chaulmoogra oil was given orally, with additional treatments in 39, and various other treatments were used in addition in some cases, so that a critical evaluation of the medical treatment was not possible. Parole was only granted after repeated physical and bacteriological examinations, and the relapses during the last ten years have been only 3 per cent. A diagram shows a considerably increased rate of discharge during the last five years and the conclusion is come to that "advanced therapeutic measures and improved methods of hospitalization have increased the parole rate in this hospital."

L. R.

HENDERSON (John M.). **A Review of our Present Knowledge of the Bacteriology and Pathology of Human Leprosy.**—*Indian Med. Gaz.* 1930. Feb. Vol. 65. No. 2. pp. 93–106. [4 pages of refs.]

This is a valuable review of a difficult subject with an extensive list of references. The Bacillus leprae is first described; the vexed question as to whether the organism has been cultivated is not discussed but is said to be doubtful. Animal inoculations are considered briefly, and eight years' experiments on various animals at the Calcutta School of Tropical Medicine are said to have yielded no results worth recording. The microscopical characters of leprous lesions are described in detail on the lines of the author's previous publications and the various blood reactions are dealt with, together with the nature of the "leprous reaction."

L. R.

OLPP. Gelöste und ungelöste Probleme der Lepraforschung. [**Solved and Unsolved Problems of Leprosy Research.**]—Reprinted from *Verhandlungen d. Deut. Gesellschaft f. innere Med.* 1929. XLI Kongress Wiesbaden. pp. 257–265. [38 refs.]

The author in this lecture discusses the history and present state of our knowledge of the following aspects of leprosy: chaulmoogra oil treatment, the question when a case can be said to be cured, biology of the lepra bacillus, mode of infection, epidemiology, statistics, racial incidence, relations to other diseases, leprosy reaction, diagnosis and prognosis. He concludes that the chief present-day requirements are: The education of a large number of leprologists, the calling in of rhino-laryngologists for rapid diagnosis and confirmation of cure, the earliest possible certification of the diagnosis, the registration of patients and their treatment by specialists in clinically conducted hospitals and polyclinics, which must be separated from the asylums for far-advanced so-called "burnt-out" cases. Isolation is to be considered only for patients who are out of work and seriously ill or for advanced cases, for compulsory isolation nowadays does more harm than good. In leper asylums a rational work treatment is to be employed. The examination of the inhabitants of houses where contagious lepers are living should be systematically carried out for five years. The financial and social problem must be solved by the government departments and charitable societies. The intellectual and religious needs of patients are to be catered for in an organized manner. The population must have explained to them that leprosy is curable and that the earlier it is treated the easier it is to cure.

L. R.

BRAUL (J. E.). Ueber die Rolle eines Insultes in der Ätiologie und im Verlaufe der Lepra. [**The Role of Depression in the Aetiology and Course of Leprosy.**]—*Arch. f. Dermat. u. Syph.* 1930. Feb. 15. Vol. 159. No. 2. pp. 308–310. [10 refs.] [Crimean Pasteur Inst., Simferopol.]

The author points out that close contact with lepers, as in the case of attendants in leper colonies or leprous relations, does not necessarily result in infection. Moreover, the first symptoms may appear after some other depressing condition, such as severe colds or chills, when

the disease may make rapid progress either in the form of a succession of reddish slightly-raised patches, or as multiple lesions, called by W. J. Anderson pseudo-erysipelas leproides, often accompanied by fever. Brief notes are given of eight cases; these include the appearance of the first signs of leprosy after an operation in one, after extensive scalding of the feet in another, after an attack of influenza in five more and in the remaining one after an injection of oil of gynocardia; all of which appear to have predisposed to the onset of the first symptoms of leprosy.

L. R.

Lindberg (K.). Un essai de classification pratique des lépreux. [**A Classification of Lepers.**]—*Rev. Méd. et Hyg. Trop.* 1930. Mar.–Apr. Vol. 22. No. 2. pp. 73–78.

The author describes an elaborate classification in which A represents nerve lesions and B dermal ones, as in Muir's nomenclature. The cases in each group are divided up into ten degrees from 1 to 10, instead of three by Muir, and C is used to denote mutilations. Thus a mixed case may be called $A^3B^1C^2$ for example. He classed 429 adults as A 10·7 per cent., AB 14·7, ABC 34·5, AC 39·6, B 0·7, and C 0·46.

L. R.

Rodriguez (Jose). **The Early Symptoms of Leprosy.**—*Jl. Philippine Islands Med. Assoc.* 1929. Dec. Vol. 9. No. 12. pp. 447–451. [1 ref.]

It is not sufficiently known that leprosy can often be diagnosed clinically before cases are positive bacteriologically. The author has seen 205 such cases at the Cebu skin clinic in the Philippines and 100 cases are analysed. Half were under 20 years of age as usual, and at the probable date of onset 77 per cent. were below that age. In nearly half the duration of the disease was from one to three years, but varied from two months to 15 years, so this stage may last a long time. Numbness and paraesthesia are the earliest prodromal symptoms, and the main initial lesions were pale macules, reddish macules, and anaesthetic patches, while less frequent were urticarial-like rashes, vesicular eruptions, ichthyosis and atrophy of the hand muscles, and a single initial lesion was recognized in 93 per cent. of the cases. Many patients showed thickening of ulnar and great auricular nerves and also enlarged inguinal and supratrochlear glands.

L. R.

Nativelle (R.). La bacillemie lepreuse. [**Bacillaemia in Leprosy.**]—*Rev. française de Dermat. et Vénéréol.* 1930. Jan. Vol. 6. No. 1. pp. 8–11. [11 refs.]

Since leprous bacillaemia was first described by Gougerot in 1906 it has frequently been reported. The subject is discussed once more in this short paper, and the occurrence of the bacilli in the circulation during febrile exacerbations with the appearance of new lesions is confirmed. They can occasionally be demonstrated microscopically by taking several cc. of blood from a vein, haemolysing it and staining the centrifuged deposit.

L. R.

Häupl (Carl). Beitrag zur Kenntnis des Knochenschwundes bei Lepra. [**Bone Atrophy in Leprosy.**]—*Acta Path. et Microb. Scandinavica.* 1930. Supplement V. pp. 35–36.

Bone changes in leprosy generally occur in one of two forms. One results from rarefied ostitis and periostitis of an inflammatory nature due to a mixed infection including the leprosy bacillus. In the other form atrophy and absorption of bone takes place, especially in the fingers and toes, in relation to trophoneuritic disturbances. In a specimen of the latter form affecting the toe nothing but adipose tissue remained, and sections of the neighbouring nerves showed that the bone changes could be traced to destruction of the nerve tissues. The vessel walls showed thickening, and joint alterations in the form of commencing arthritis deformans were found. The bone marrow consisted solely of adipose tissue.

L. R.

Aleixo (Antonio). Lymphangite da lepra. [**Lymphangitis in Leprosy.**]—*Brasil-Medico.* 1930. Feb. 1. Vol. 44. No. 5. pp. 128–131. With 2 text figs. [2 refs.]

Of 56 patients examined 13 had a lymphangitis ; 10 of these were of the mixed form, 3 of the nervous. Excision showed that the swellings consisted of nodules along the lymphatic cords. Though remarked on previous occasions, little attention has been paid to this condition.

H. Harold Scott.

Hopkins (Ralph), Denney (O. E.) & Johansen (F. A.). **Immunity of Certain Anatomic Regions from Lesions of Skin Leprosy.**—*Arch. Dermat. & Syph.* 1929. Dec. Vol. 20. No. 6. pp. 767–777. With 10 text figs. [1 ref.]

A survey of 302 lepers disclosed the fact that certain areas of the skin are rarely affected. These include the back of the ear, the concha, orbital side of the nose, the lateral palpebral area external to the outer canthus, the axilla, the inframammary fold in women, the interdigital surfaces and the perineum, and they are those less exposed to irritation by sunlight, heat, cold, pressure, friction and causes producing hyperaemia. Excellent photos illustrate this distribution of the lesions.

L. R.

Stein (A. A.). Zur Morphologie der Viscerallepra. [**The Morphology of Visceral Leprosy.**]—*Arch. f. Dermat. u. Syph.* 1929. Vol. 158. No. 2. pp. 450–459. [36 refs.] [State Inst. for Exper. Med., Leningrad.]

The author's material was from 4 autopsies on leprous men from the " Krutyi Rutschji " Leprosarium (Leningrad Government). He draws the following conclusions from his investigations :—

(1) The leprosy cells represent derivatives of the reticulo-endothelial system or of the histiocytes of the connective tissue.

(2) These cells constantly contain lipoid inclusions which for the most part show a characteristic vacuolization. Morphologically or microchemically demonstrable cholesterin cannot be discovered in these cells.

(3) Apart from the leprosy cells or the cells of the reticulo-endothelial system, the bacilli and lipoid dropules are demonstrable also in some endothelial cells, e.g., in the endothelium of the cutaneous capillaries. There is, however, no transformation of the endothelial cells into genuine leprosy cells.

(4) The lipoids contained in the leprosy cells are most probably of an infiltrative nature; in explaining their origin we must take into account the large quantities of lipoids (chaulmoogra oil and its derivatives) that are introduced into lepers for curative purposes.

(5) On the basis of statements in the literature and of the author's own observations he assumes that the lipoid infiltration of the leprosy cells is of significance for the process of destruction of the lepra bacilli.

L. R.

Saijo (Yoshika) & Takino (Masuichi). Die Nervenendapparate im leprösen Gewebe. [**The Nerve-Endings in Leprous Tissue.**]—*Acta Scholae Med. Univ. Imperialis in Kioto.* 1929. Vol. 12. No. 1. pp. 55–62. With 4 figs. on 1 plate. [Path. Inst., Imperial Japanese Univ., Kyoto.]

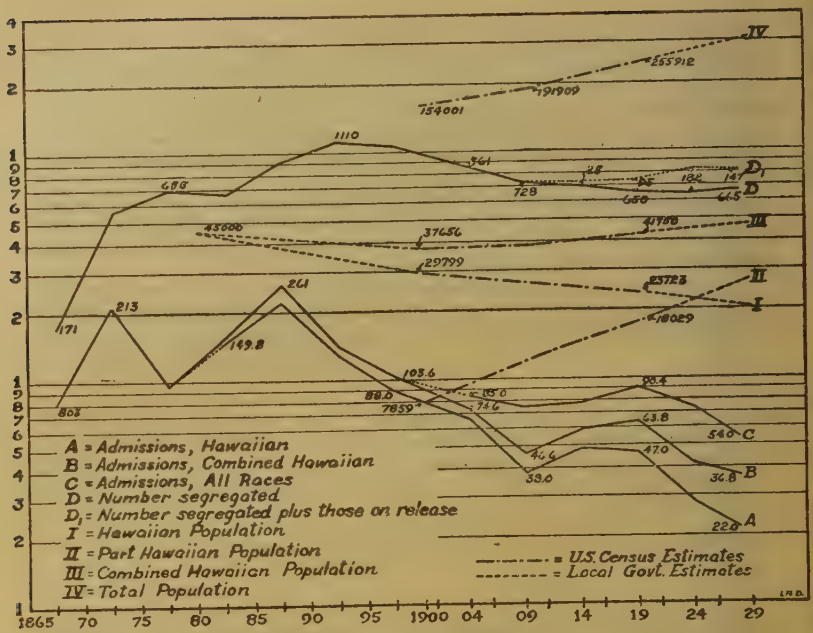
An examination of fresh material from two post-mortem examinations.

L. R.

Wayson (N. E.). **Observations on the Treatment of Leprosy in Hawaii.**—*Public Health Rep.* 1929. Dec. 20. Vol. 44. No. 51. pp. 3095–3110. With 1 chart.

This paper gives an interesting account of 60 years' trial of compulsory segregation in Hawaii, the main facts of which are best brought out by the accompanying graph. A decline in the number of admissions is shown, but the population of Hawaiians, who are most affected, has fallen by 50 per cent. in the last 50 years. The total number of lepers was over 1,000 as late as 1890, but is now 700, and the number now segregated is approximately as in 1875. It is concluded that "it is improbable that the decreasing rate of leprosy in Hawaii is attributable to any great extent to the practice of segregation." Improved sanitation has played a part. The cost of segregation is $1 per head of the population.

The effect of treatment is next discussed critically, including the use of ethyl esters intramuscularly in about 800 admissions since 1918. It is estimated that "perhaps from 8 to 10 per cent. of clinically recognized cases, even undergo arrest spontaneously" so the effects of treatment are difficult to evaluate [This is several times as high a figure as that of the Philippine average.] Tables are given of the results in terms of releases and relapses of 485 cases treated with the esters, and of 260 so treated for six months or more considered 3½ and 5 years respectively after cessation of treatment; 30 to 33 per cent. were temporarily released, more than half of whom returned with relapses within three and a-half to five years, leaving about 15 to 18 per cent. of those treated to continue on release for longer periods, and about 80 per cent. of the latter were in the group negative bacteriologically. During the ten-year period prior to the use of the esters 8·8 per cent. were released. During the last two years 51 patients, or 25 per cent. of those remaining in hospital more than six months, have been released



Average annual number of lepers admitted and in segregation during 5-year periods from 1865 to June 1929 in relation to the Hawaiian, part Hawaiian, combined Hawaiian (Hawaiian and part Hawaiian or Hawaiian strain) and total population changes in Hawaii.

[Reproduced from *Public Health Reports.*]

temporarily and 2 have returned with relapses. The author therefore concludes that in the class of patients admitted under the compulsory segregation system the percentage remaining under release after treatment with the ethyl esters is approximately the same as before their use, and the results do not indicate any specific therapeutic value of the ester treatment. He thinks that much of the drug in this form remains unabsorbed in the muscles.

L. R.

Fiji Annual Medical and Health Report for Year 1928. pp. 58–74. With 1 graph, 2 diagrams & 5 plates.—**Report by Dr. E. A. Neff, Medical Superintendent, Central Hospital for Leprosy, Makogai.**

Dr. Neff, in his report on the results of treatment at the Central Hospital for Leprosy, Makogai, states that they permit him to be "thoroughly optimistic," for 53 patients were passed for discharge by the medical board, or 16·1 per cent. of the treated and 12·4 per cent. of the total patients. Every attention is paid to improving the general health and to providing occupation and amusements, in addition to steady persistence with the various modern preparations of chaulmoogra oil, including Alepol, sodium gynocardate, Wightiana ethyl esters manufactured locally and a similar preparation from a local "dilo" oil from the *Calophyllum bigator,* which he thinks is of some value as an

alternative treatment. The first two mentioned proved to be the most powerful therapeutic agents; the esters approach them closely in value, but cause more local irritation at the site of the injection. Weekly intramuscular injections of the various preparations are given into the deltoid and gluteus muscles. The "dilo oil" has useful analgesic properties. The "early" and "moderately advanced" cutaneous cases showed a higher percentage of improvement than the similar stages of nerve cases, but the latter gave a higher percentage of the total discharges. The locally grown *H. wightiana* trees are now 16–18 feet high, and 700 *H. anthelmintica* trees are well established; the seed was supplied by the British Empire Leprosy Relief Association several years ago. A number of excellent photos illustrating recoveries conclude a good report.

L. R.

Schwetz (J.). A propos du traitement de la lèpre par les éthers éthyliques de l'huile de chaulmoogra. (Hyrganol Poulenc et Graumanyl Meurice.) [**Treatment of Leprosy by Ethyl Esters of Chaulmoogra.**]—*Ann. Soc. Belge de Méd. Trop.* 1929. Dec. 31. Vol. 9. No. 4. pp. 319–339. [Parasit. Lab., Stanleyville.]

In the Belgian Congo leprosy is very unevenly distributed; it is most prevalent in the eastern province with one or two lepers in nearly every village, but the total numbers are unknown. At Stanleyville the author has treated fifteen well-marked cases with Chaulmoogra ethyl esters, and he concludes that the results were disappointing and the preparation cannot be considered a rapidly acting specific remedy.

L. R.

Eubanas (F.). **Progress in Antileprosy Treatment at Cebu Treatment Station: Second Progress Report.**—*Jl. Philippine Islands Med. Assoc.* 1929. Dec. Vol. 9. No. 12. pp. 452–457. [5 refs.]

At this hospital during the semester ending June, 1929, 341 patients remained segregated, of whom 69 were negative, 87 had markedly improved, 52 moderately and 53 slightly improved; 65 were stationary and 15 worse, although the 89 new admissions had received less than six months' treatment with the esters. The paroled numbered 44 against 9 in the same period of 1928. A trial of buffered sodium hydnocarpate gave promising results in a short time.

L. R.

Pineda (E. V.), Pineda (E. R.) & Dayrit (A.). **Leprosy Treatment at San Lazaro Hospital, Manila.**—*Jl. Philippine Islands Med. Assoc.* 1929. Dec. Vol. 9. No. 12. pp. 443–446.

This contagious disease hospital in the Philippines has a leper department in which uninfective cases can also be treated as out-patients without isolation. Pure Wightiana oil and the ethyl esters are used intramuscularly and by infiltration of the superficial cutaneous and subcutaneous lesions. Nasal leprotic ulcers are treated with 3 per cent. alepol or 20 per cent. Wightiana oil in vaseline scented with some volatile oil, and this is also used as preventive in markedly improved and negative cases. Relatively early cases come to this hospital; 375 patients were present in December, 1928, and of 335 treated

for six months and over 11 per cent. were negative, 62·6 improved and 17 per cent. worse, due to the progress of the disease being uncontrolled. "Slight" cases showed 30·8 per cent. negative, "moderate" ones 7·3 and of "advanced" cases only 1·3 per cent. cleared up. The present policy of keeping early cases in the regional-treatment stations at San Lazaro, Cebu and other places and sending only fairly advanced cases requiring longer treatment to Culion, is thus justified, for 16 of the early cases were cleared up in one to five months' treatment at the hospital.

L. R.

Aoki (T.) & Aoki (Y.). Zur Diagnose und Therapie der Lepra mit Berücksichtigung der intravenösen Injektion von Jodnatrium-lösung. [**Intravenous Injection of Sodium Iodide in the Diagnosis and Treatment of Leprosy.**]—*Dermat. Woch.* 1930. Mar. 29. Vol. 90. No. 13. pp. 438–451. [58 refs.]

The difficulties in the diagnosis of some cases of early leprosy are pointed out and the authors' experience of the value of bacteriological examinations of the skin and of the nose respectively is in favour of the former as the more reliable. The diagnostic value of reactions following iodides has long been known, but is less marked in the difficult maculo-anaesthetic cases, while the therapeutic action is variable. They think it is best and most safely given intravenously, as the reactions are milder, and begin with 1 cc. of 5 per cent. sodium iodide, gradually increased at 10 to 14 days' intervals up to 20 cc. in some cases. They find this an excellent diagnostic and therapeutic method in early cases of leprosy.

L. R.

Fidanza (Enrique P.), Fernandez (Jose M. M.) & Schujman Salomon). Sobre el valor del yoduro de potasio solo y asociado en el tratamiento de la lepra. [**Potassium Iodide alone and in Conjunction with Other Drugs in the Treatment of Leprosy.**]—*Semana Méd.* 1930. Jan. 23. Vol. 37. No. 4. (1880). pp. 193–201.

The cases recorded are too few to allow of anything more than general impressions being given. The results of iodide treatment were to produce a lighting up of the foci present, rise of temperature, pain in the limbs, a transient nodular erythema, prostration, rapidity of heart action, and an outpouring of bacilli into the blood due to destruction of lepra cells. When given alone the iodide was gradually raised to a maximum dose of 44 gm. [stated as grs. but gm. is evidently intended since the authors call 250 grs. "a quarter of a kilo"]. To counteract untoward effects a saline purge was given together with adrenalin, ephedrin, pyramidon, or calcium chloride, while the patient was kept on milk diet.

H. Harold Scott.

Amies (C. Russell). **The Treatment of Leprosy with Solganal. A Record of Eight Cases.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Nov. 25. Vol. 23. No. 3. pp. 309–314. [9 refs.] [Inst. for Med. Research, Kuala Lumpur, F.M.S.]

This is a short paper in which, after referring to previous trials of gold preparations in leprosy by Paldrock and others, the author records

the trial of intravenous injection of solutions of solganal in doses gradually increased from 0·01 up to 1·0 gm. in eight cases of leprosy, all but one of which were early, not previously treated, and so favourable ones. Four had eye complications, as gold preparations have been advised for such cases. A table of the results showed that in one the drug was stopped on account of toxic symptoms, 3 of the others showed "slight improvement" and 4 more were "improved" after six months to two years' treatment. No reactions were caused, and he concludes that although no definite opinion can be given in so few cases, "the results suggest that it has a beneficial effect on leprosy." In two cases photophobia was reduced.

A table of the results in 31 cases treated with alepol shows 3 "much improved," 17 "improved," 10 stationary and 1 case "worse."

L. R.

Delanoë (E.). Traitement mixte de la lèpre : par l'injection intraveineuse de novarsénobenzol et par les injections intramusculaires de vaccin B.C.G. ; la parfaite tolérance de cette méthode de traitement, la rétrocession rapide des phénomènes morbides. [**Treatment of Leprosy by Novarsenobenzol and B.C.G. Injections.**]—*Bull. Soc. Path. Exot.* 1929. Dec. 11. Vol. 22. No. 10. pp. 898–903. [3 refs.]

Two cases of leprosy are reported in which the intramuscular injection of B.C.G. tubercle cultures proved to be harmless and, in combination with novarsenobenzol intravenously, was followed by manifest benefit.

L. R.

Le Roy des Barres (A.). Note sur un traitement indigène de la lèpre. [**An Indigenous Treatment of Leprosy.**]—*Rev. Méd. et Hyg. Trop.* 1930. Jan.–Feb. Vol. 22. No. 1. pp. 5–22.

A Cochin China remedy, consisting of 23 ingredients, varying from indigenous vegetable drugs to the bone of a tiger and the skin of a rhinoceros, was used in 26 cases, all of which are said to have derived benefit, especially as regards their general condition and in the appearance of the skin lesions, but less so as regards nerve symptoms. It is concluded that there was nothing marvellous in the results, such as has been claimed for this remedy.

L. R.

Sezary (A.). L'autohémothérapie dans la lèpre. [**Autohaemotherapy in Leprosy.**]—*Bull. Soc. Française Dermat. et Syph.* 1930. Feb. 2. pp. 289–292. [1 ref.]

Brief notes are given of seven cases of leprosy treated by the subcutaneous or intramuscular injection of blood in a dose of 5 cc. followed by 10 cc. doses. No appreciable local or general reaction followed, but it is stated that a more or less favourable action was noted, especially in the form of decreased subjective symptoms and pain. No claim is made that the method is really curative.

L. R.

de Raadt (O. L. E.). Das Ernährungsproblem in der Bekämpfung der Lepra und Tuberkulose. [**The Problem of Nutrition in the Combating of Leprosy and Tuberculosis.**]—*Ztschr. f. Tuberkulose.* 1929. Vol. 54. No. 6. pp. 492–496. [15 refs.]

The author refers to his theory, published several years ago, that the autophenolization of the human body has an injurious effect upon the

lepra and tubercle bacilli and therefore protects the body against both diseases, and that this autophenolization is a biochemical process which can only become effective in the normal human being when the diet contains a sufficient quantity of vegetable protein; hence the occurrence of leprosy in two quite distinct types of people, in the fish-eating population on the coasts of Norway, Sweden, in the South Sea Islands, etc., and in the inhabitants of tropical regions where the diet consists chiefly of vegetable food poor in proteins.

At the author's suggestion a number of his colleagues in the Dutch East Indies phenolized their pulmonary tuberculosis patients by means of the daily administration of 250 mgm. of phenolum cryst dissolved in cod liver oil (divided into 3 doses, one after each meal). This treatment was continued for at least 4 months. The results in 45 patients were as follows:—

1. A strikingly favourable effect upon the disease process was unmistakable, so as to justify the assumption that an autophenolization of normal strength must be able to protect the body against the disease.
2. The phenol was superior in its effect to the drugs of the guiacol group.

No disadvantages were observed due to this medication.

During the period of phenol treatment the patient may have an animal diet without harm; it is to some extent an advantage, since animal protein is biologically most effective especially in weak, emaciated individuals. After cessation of this medication, however, it is absolutely necessary to prescribe a diet rich in vegetable protein.

The author believes that there are thus sufficiently weighty reasons for fundamentally changing the present-day lines on which lepers and consumptives are fed.

L. R.

Schöbl (Otto), Pineda (Eloy V.) & Miyao (Isao). **Clinical Skin Lesions in Philippine Monkeys resulting from Experimental Inoculation with Human Leprous Material.**—*Philippine Jl. Sci.* 1930. Mar. Vol. 41. No. 3. pp. 233–245. With 6 plates. [2 refs.]

A study of the literature shows very general scepticism regarding the transmission of leprosy to animals, since after inoculation of monkeys with leprous material the temporary nodules do not furnish reliable evidence of the proliferation of the lepra bacilli in the animal tissues. The present workers have used the method of superinfection—which had proved of value in their hands in the case of yaws—with the result that after a fairly long incubation an allergic stage of tissue activity manifested itself in a rather sudden appearance of hard indurations at all the places of previous inoculation performed at various times during the incubation. Acid-fast bacilli were found, both single and in bundles; central breaking down of the tissues took place with discharge of pus containing acid-fast bacilli, sometimes phagocytosed, with formation of ulcers with drying and cicatrization from the periphery. Excellent photos of the infected monkeys are included in the paper.

L. R.

FRANCHINI (Giuseppe). Sulla riproduzione sperimentale della lebbra nella scimmia. [**Experimental Leprosy in the Monkey.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Jan. 1. Vol. 11. No. 1. pp. 1–3. With 1 text fig. English summary (5 lines) p. 4. [Inst. of Trop. Path., Univ., Bologna.]

A *M. sinicus* was inoculated in the supraorbital region in April, 1926, with material from a leproma rich in bacilli. Two months later a nodule appeared and juice extracted from it contained Hansen's bacilli in masses and singly. The lesion cicatrized in a little over a month. Twenty-two months after the first inoculation a nodule again formed, containing bacilli, and again the lesion a month later was reduced to a mere thickening of the skin which was absorbed in a few weeks. In July, 1929, having in the interval maintained excellent health, the animal began to waste and muscular atrophy passed on to true paralysis of the limbs. At the old site over the eye a small nodule again appeared and contained bacilli in November ; death occurred early the following month, but no macroscopic signs were found to account for the death.

H. Harold Scott.

GOMES (J. M.). Desvio do complemento na lepra. [**Complement Reaction in Leprosy.**]—*Rev. Biol. e Hyg.* S. Paulo. 1929. Vol. 2. No. 1. pp. 49–65. With 2 text figs. English summary pp. 65–67. [Hyg. Inst., S. Paulo.]

Hitherto this test has been carried out chiefly in advanced lepers, so the writer has tried it in early, suspected, carrier or contact cases, using fat-free Deycke bacillus as the antigen. He concludes that the test is of great diagnostic value in such cases and in healthy contacts may indicate immunity, and when such immunity fails, clinical symptoms begin to appear. Well-treated recent cases pass from a positive to a negative complement reaction. Plus reactions were obtained in 58·8 per cent. of 119 early cases, and in 66·7 per cent. of 63 suspected cases.

L. R.

AMIES (C. Russell). **The Wassermann and Kahn Reactions in Leprosy.** —*Malayan Med. Jl.* 1929. Dec. Vol. 4. No. 4. pp. 129–132. [17 refs.]

After discussion of the literature, the results of Harrison's Wassermann and the Kahn reactions in 362 lepers are recorded. They showed 37·5 per cent. plus against 20 to 25 per cent. of Malayans with syphilis. The excess was found in all 17 reacting cases with high protein in the serum, and antisyphilitic treatments were effective in 75 per cent. of 90 positive cases.

L. R.

LUZ (A. Cerqueira). Contribuição ao estudo sorologico da lepra. [**The Serological Study of Leprosy.**]—*Brasil-Medico.* 1929. Dec. 14. Vol. 43. No. 50. pp. 1526–1529.

Two tests are here recorded, the Wassermann reaction and Rubino's corpuscle sedimentation. As regards the former, among 77 leper patients there were 4 strongly and 2 less marked but still definitely positive, 69 negative and 2 anticomplementary sera. With the Rubino test, using sheep's corpuscles, with or without formol, he obtained 21 positive, 21 negative, and 3 doubtful results among

45 nodular cases ; 6 positive, 11 negative, 1 doubtful among 18 nervous cases ; 8 positive and 8 negative among 16 of the mixed forms. Nevertheless, the author regards the test as of value because of the large proportion of positive results given in early or masked (frustra) cases. As controls he tested 76 cases of syphilis and 20 of tuberculosis, all of which were negative.

H. Harold Scott.

Schlossmann (K.). Die Kultivierung des Lepraerregers. I. Mitteilung. [**Cultivation of the Leprosy Bacillus.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. Feb. 20. Vol. 115. No. 7/8. pp. 474–480. With 3 text figs. [4 refs.] [Bact. Inst., Dorpat, Estonia.]

In 1923 the author began a systematic attempt to grow the leprosy bacillus, which is not yet completed. He used media which had proved successful in the case of the closely allied tubercle bacillus, mostly including glycerin, on to which pieces of leprous tissue were implanted. He points out that in such primary cultures it is difficult to be sure if any multiplication of the lepra bacilli has taken place or not, and sub-cultures must be obtained for that purpose. He has planted out from the first cultures material very rich in acidfast bacilli, but since only two or three months have elapsed he is not able to say whether the sub-cultures have proved successful or not.

L. R.

Wherry (W. B.). **Note on the Cultivation of an Acid Fast Bacillus from Leprosy.**—*Jl. Infect. Dis.* 1930. Mar. Vol. 46. No. 3. pp. 263–266. With 2 text figs. [2 refs.] [School of Hyg. & Public Health, Univ. of the Philippines, Manila.]

In this short note it is stated that CO_2 is essential to the growth of the tubercle and the leprosy bacillus, and methods of varying the O_2 and the CO_2 supply are described. An egg medium containing 3 to 6 per cent. of glycerin is used, with 1 per cent. agar and a little 10 per cent. glucose to make a semi-solid medium, and inoculated with numerous lepra bacilli from a nodule. No visible growth appeared, but after 4 to 6 weeks at 35° to 37° C. microscopic colony-like masses of acid-fast bacilli were found, which were regarded as cultures.

L. R.

de Souza-Araujo (H. C.). [In Portuguese & English.] Estudos sobre a lepra. II. Tentativas de cultura do *Mycobacterium leprae.* (*Coccothrix leprae,* Lutz 1886.) Isolamento de um actinomyces de um leproma. *O. actinomyces lepromatis,* n. sp. (Amostra Hilda). **Studies upon Leprosy. II. Attempts to cultivate the** *Mycobacterium leprae.* **Isolating an Actinomyces from a Leproma. The** *Actinomyces lepromatis* **n. sp. (Hilda's Sample).**—*Mem. Inst. Oswaldo Cruz.* 1929. Vol. 22. In Portuguese pp. 145–152. With 4 plates (1 coloured). In English pp. 153–160. [1 ref.]

Cultures made from pieces of leprous nodules dissected out free from the skin are reported to have produced copious growth in a large variety of ordinary media, and to have developed into the *Actinomyces lepromatis.* The author concludes that he does not yet know the relationship of this organism to leprosy, but its isolation partially confirms the earlier work of Deycke, Kedrowski and others, while in fat-containing media it develops acid-alcohol-fast bacillary forms.

L. R.

Koike (Totaro). Impfversuch mit Blut von mit einigen chronischen Infektionskrankheiten behafteten Patienten, unter besonderer Berücksichtigung des Leprablutes. [**Inoculation Experiment with Blood from Patients affected with Chronic Infectious Diseases with Particular Reference to Leprous Blood.**]—*Okayama-Igakkai-Zasshi* (*Zent. d. Okayama Med. Gesellsch.*). 1929. Sept. Vol. 41. No. 9. pp. 2099–2106. [In Japanese. German summary p. 2107.] [Skin Clinic, Univ., Okayama.]

Koike has tested Ehara's statement that rabbit's testicle inoculated with leprous blood shows a specific change, and has further made the same experiment with serum, a suspension of blood corpuscles (1 part blood-corpuscles and 4 parts 0·9 per cent. salt solution) and inactivated serum (heated for 1 hour at 56° C.).

He concludes that leprous blood, chiefly the serum, contains a specific substance, sensitive to heat, which quickly atrophies the rabbit's testicle. Atrophy of the testicle was never observed in the case of healthy blood, and only to a slight degree in the case of blood from the syphilitic patients.

L. R.

Molinelli (E. A.) & Vaccarezza (A. J.). El líquido céfalo-raquídeo en la lepra. [**The Cerebrospinal Fluid in Leprosy.**]—*Semana Méd.* 1930. Jan. 30. Vol. 37. No. 5 (1881). pp. 310–313. [11 refs.]

The fluid from 69 patients, 21 of the nervous form, 17 nodular and 31 mixed, was examined chemically and microscopically and the results are given in tabular form. All were inmates of the José Penna Institute for Infectious Diseases and had had the disease from periods varying from one month to thirty years. The results were almost completely negative, but are nevertheless instructive.

The tension as measured by Claude's manometer was normal, the Pandy and Nonne-Apelt tests for globulin were negative, the amounts of albumin, chlorides, glucose and urea (by Folin and Wu, Motr, and Ivon's methods) were none in excess of normal; leucocytes never exceeded 1·2 per cmm. and were usually from 0·6–0·8; Lange's colloidal reaction was negative in all but four, and in these the change was so slight as to be regarded as of no clinical significance. The Wassermann reaction was positive in 17 sera, but negative in all the spinal fluids. In none were Hansen's bacilli found. In short, examination of the spinal fluid yields no information of any diagnostic or prognostic value.

H. Harold Scott.

Tisseuil (J.). Réaction, chez l'homme, du tissu cellulaire sous-cutané et du derme, aux bacilles lépreux tués par la chaleur. [**Reaction of Subcutaneous Tissue to Lepra Bacilli killed by Heat.**]—*Bull. Soc. Path. Exot.* 1930. Jan. 8. Vol. 23. No. 1. pp. 20–23.

Trials of the subcutaneous injection of emulsions of leprous nodules killed by heat and of Marchoux's *B. pulviforme*, both in healthy subjects and in clinically cured lepers, have been made, with the result that a slowly forming abscess appeared. In the case of lepers a similar abscess was produced by the *B. pulviforme*, but not with human lepra bacilli emulsions.

L. R.

Le Gac (P.). La réaction de Botelho dans la lèpre suivant la technique d'Itchikawa et de Baum. [**Botelho's Reaction in Leprosy by the Technique of Itchikawa and Baum.**]—*Bull. Soc. Path. Exot.* 1930. Jan. 8. Vol. 23. No. 1. pp. 105–106. [3 refs.] [Abidjan Lab., Ivory Coast.]

In view of the difficulty in confirming a diagnosis of leprosy this reaction has been studied in the following manner. Place in a test-tube 0·6 cc. of serum 24 hours after taking the blood, one drop pure ammonia, 3 cc. of 1 per cent. nitric acid in 7·5 per cent. physiological saline and 0·5 cc. at a time up to 0·3 cc. of iodine 1 gm., KI 2 gm. in 210 gm. distilled water, and shake after each addition. A positive reaction is indicated by the immediate formation of a permanent precipitate. The iodine solution must be freshly prepared every 2 to 4 weeks. Tests have been made in 87 bacteriologically positive lepers with positive results in 63, or 72·4 per cent. The reactions were more frequent in nerve than in nodular cases.

L. R.

Markianos (J.). L'ultra-virus de la lèpre des rats. [**The Ultra-Virus of Rat Leprosy.**]—*Bull. Soc. Path. Exot.* 1929. Dec. 11. Vol. 22. No. 10. pp. 896–897. [Pasteur Inst., Paris.]

This is a brief record of the results of inoculating five rats with material from rat leprosy which had been passed through a L_2 Chamberland filter. In several of the animals numerous acid-fast bacilli were found, together with ulceration and enlargement of glands containing them. This confirms the existence of an ultra-virus stage of the organism of rat leprosy.

L. R.

Valtis (J.) & Markianos (J.). Influence du BCG sur la lèpre murine. [**Influence of B.C.G. on Rat Leprosy.**]—*C.R. Soc. Biol.* 1930. Feb. 21. Vol. 103. No. 7. pp. 483–485. [3 refs.]

Subcutaneous injections of BCG were tried in five rats infected with the Bacillus stephanski, and six more were kept as controls. The injections were well borne and soon absorbed without remaining trace. The authors conclude that the treatment had a favourable influence on the evolution of rat leprosy as shown by the healing of the cutaneous ulceration and a retardation of the generalization of the infection.

L. R.

Markianos (J.). Essai de traitement de la lèpre des rats par les bacilles dégraissés. [**Treatment of Rat and Human Leprosy by Defatted Bacilli.**]—*Bull. Soc. Path. Exot.* 1930. Feb. 12. Vol. 23. No. 2. pp. 145–148.

——. Recherches sur l'action préventive sur la lèpre des rats de l'antigène de bacilles dégraissés.—*Ibid.* pp. 149–150.

——. Application de l'antigène dégraissé de bacilles de la lèpre murine, dans le traitement de la lèpre humaine.—*Ibid.* pp. 150–152.

These three short papers relate to a series of interesting experiments in treatment by means of a vaccine prepared by separating the bacillus of rat leprosy in nodules from the animal tissues by digesting with pepsin in an acid medium or pancreatine in an alkaline one, separating the remaining acid-fast bacilli after neutralization of the medium, decanting and centrifuging. The organisms are then washed in water several times, and afterwards in absolute alcohol, and are finally defatted and sterilized in ampoules containing 300 millions per cc. Two infected rats were treated with this vaccine and six kept as controls, with the result that the treated rats showed more limited infections than the controls. In the second paper

an experiment is described in which the preventive action of the preparation was tested by injecting healthy rats with small doses of the preparation twice weekly with ½ cc. doses up to a total of 4 cc. of the defatted bacilli, and two such rats were infected with the rat leprosy bacilli together with four controls, with the result that the treated animals showed less accentuated lesions than the controls with attenuation of the infective process.

In the third paper a case of human leprosy treated with the vaccine is recorded. The patient showed numerous macules with some infiltration of the skin and areas of anaesthesia. Doses gradually increased from 2 cc. to 8 cc. were injected one or twice a week subcutaneously without any general reaction, but with the production of a local sterile abscess without any acid-fast bacilli in the pus ; after healing of this some improvement in sensation and diminution of the infiltration of the skin were noted indicating a favourable effect. Further work on these lines will be awaited with interest.

L. R.

Markianos (J.). Essai de traitement de la lèpre murine. [**Treatment Trials in Rat Leprosy.**]—*Bull. Soc. Path. Exot.* 1930. Mar. 12. Vol. 23. No. 3. pp. 268–272. [1 ref.]

Trials of nine new drugs on rat leprosy are recorded, of which " fleolate of sodium," " 579B " and " 579A " were found to exert a beneficial effect. They were supplied by MM. Fourneau and Sivadjan. Their chemical constitution is not given.

L. R.

Zolkevitsch (Anna). Ueber die morphologischen und biochemischen Veränderungen des Bact. leprae Kedrowski unter dem Einfluss der Radiumemanation. [**On the Morphological and Biochemical Changes in Bact. leprae Kedrowski under the Influence of Radium Emanation.**] —*Zent. f. Bakt.* I. Abt. Orig. 1929. July 8. Vol. 113. No. 1/2. pp. 67–71. With 13 text figs. [1 ref.] [Med. High School, Leningrad.]

Cultures of Bacterium leprae of Kedrowski were inoculated on to potato and subjected to the action of radium emanation with results which are described.

L. R.

REVIEWS AND NOTICES.

ROGERS (Leonard) [C.I.E., M.D., B.S. (Lond.), F.R.C.P., F.R.C.S., F.R.S., etc.] & MEGAW (John W. D.) [C.I.E., V.H.S., B.A., M.B., B.Ch., B.A.O., etc.]. **Tropical Medicine.**—pp. x+536. With 77 text figs. & 93 coloured figs. on 2 plates. 1930. London: J. & A. Churchill. (Churchill's Empire Series.) [14s.]

The publication of a new text-book on Tropical Medicine must of necessity interest all those whose work lies in that branch of medical science. The authors in their preface state that " the issue of this volume calls for an explanation . . . they are convinced that there is a real need for a *small* work on tropical medicine which will contain only such details of microscopical technique as the general practitioner can carry out in his hospital or study, and will be devoted chiefly to the recognition and management of the diseases which are *commonly* met with in tropical and sub-tropical countries . . . another point which has been considered is that there are many students and even medical men who can *ill afford the time* and money which are involved in the study of the larger books " (the italics are the reviewer's). The book, therefore, " makes no pretence at being complete " ; some rarer diseases are not mentioned, others whose distribution lies outside the British Empire receive but brief notice.

The diseases dealt with are ranged under eleven sections : I. Malaria and Blackwater Fever, Kala-azar, Trypanosomiasis and Chagas' Disease, Febrile Amoebic Hepatitis and Liver Abscess. II. Louse- and Tick-borne Relapsing Fevers, Rat-Bite Fever, Infective Jaundice group. III. Yellow Fever, the Dengue group. IV. Louse, Tick and Mite Typhus. V. Plague, Undulant Fever. VI. Amoebic and Bacillary Dysentery, Cholera, Sprue. VII. Leprosy, Yaws, Oriental Sore, Inguinal Granuloma, Tropical Ulcer, Madura Foot, Dermatomycosis, Ainhum, Chigger Disease, Climatic Bubo. VIII. Ankylostomiasis, Filariasis, Schistosomiasis. IX. Snake Poisons. X. Beri-beri group, Pellagra, Lathyrism. XI. Diseases caused by heat and light with some account of the incidence of general diseases in the tropics and hints on the use of the microscope.

Each chapter is a signed article by one or other author in each of which the writer sets out to describe anew a given disease and offer the readers facts from his large fund of experience. This makes very refreshing reading, but has led to a certain lack of systematization of the subject matter and headings and precision in description which may render reading rather difficult for the student with no previous knowledge of the subject. The authors have aimed at producing a *short work*, but let it be stated at once that their book is longer than such a standard text book as Manson's Tropical Diseases excluding the appendices. A full page illustration is allowed for rat-bite fever, over four pages are allotted to the history of malaria and room is found to discuss the quinine content of various plants. Upon those diseases in which the authors are more interested they have written fully, with authority and interest, drawing from their large collection of material in India, but other diseases just as important to the student in some other continent are less adequately dealt with. The book, therefore, which will be read by all students of tropical medicine, and more especially by practitioners in India with interest and profit, is one which is a little unequally balanced and, as must happen with any new work of the kind, is open to other criticisms which, since the authors invite criticism, may be mentioned here. A rigid scrutiny of the text would eliminate some ambiguous phrases, would regularize certain inconsistencies in reference to other authors, etc. Many facts might, one believes, have been included with benefit, but this is, of course, a matter of opinion. The plan purposely adopted of describing amoebic hepatitis long before dealing with amoebic

dysentery will not appeal to many readers and while amoebic abscess of the brain appears in the index and a page reference is given, no mention of the condition is made in the text. The method of describing the relapsing fevers is not very clear and no mention is made of *Spirochaeta duttoni*. Maps illustrating the geographical distribution of diseases are a feature of the book, but none is given for the trypanosomiases, those for relapsing fever and dengue are for India only and all are on such a small scale that it is quite impossible to learn from a map whether the particular disease illustrated is found in any particular colony or province in a continent. Temperature charts, too, with which the volume is profusely adorned are in the majority of cases bare line drawings which do not make for clearness. Other illustrations are comparatively few, not always very clear, and when taken from the composite illustrations on the walls of the Wellcome Museum of Medical Science have suffered from reduction.

H. S. Stannus.

RILEY (William A.) [Ph.D., Sc.D., Department of Zoology, University of Minnesota] & CHRISTENSON (Reed O.) [M.A., Department of Zoology, University of Minnesota]. **Guide to the Study of Animal Parasites.** First Edition.—pp. xv+131. With 33 text figs. 1930. McGraw-Hill Book Company, Inc. New York: 370 Seventh Avenue. London: 6 & 8 Bouverie St., E.C.4. [$1·50.]

In their introduction the authors point out that in the past the subject of animal parasitology has received but scant attention in the courses of zoology. The present generation has, however, seen a revolutionary change of attitude towards the subject, with the result that there has been an insistent demand for more attention to parasitic forms by departments of zoology. Under these circumstances, the authors have felt that there is place for a "Guide to the study of animal parasites."

The work is limited to the protozoa and helminths, the arthropods being omitted because in most schools where animal parasitology is taught, the work in medical and veterinary entomology is presented in a separate course, and because there are already available several excellent outlines for the study of the elements of entomology.

First comes a brief systematic review of the phyla which contain the animal parasites. The trematodes are next discussed, and chapters follow on the tapeworms and nematodes of man and animals. A special chapter deals with the determination of helminth infections through faecal examination, and contains a key to the eggs of helminth parasites in human faeces. The sources of the helminth material referred to are frogs, dog material, rabbits, rats and mice, together with specimens of human parasites obtained from dealers. The protozoa occupy about 35 pages; and literature, methods, and lists of parasites of laboratory animals comprise the last 36 pages.

There are 33 illustrations which range from the method of making blood films to the differential diagnosis of hookworms, Baermann's apparatus, and sections of amoebic dysenteric gut.

The idea of imparting knowledge of, and interest in, parasitology to the student early in his career is certainly laudable. The difficulty is to avoid giving him more information than he can absorb, and it appears to the reviewer that the average student of zoology will find this book rather too much for him.

The authors have done well to limit the size of the book to very modest dimensions, but, unfortunately, this, together with the wide field covered and numerous species dealt with, has resulted in a condensation that will make it very difficult for the ordinary junior student. In short, the reviewer feels that it is "too much and not enough."

However, the work is undoubtedly a step in the right direction. A really satisfactory text-book of elementary parasitology has yet to be produced; there is an urgent need for such a text-book and experience gained from the critical use of the present work will hasten its production.

W. Yorke.

GIBSON (Alexander George) [M.D., F.R.C.P., Physician to the Radcliffe Infirmary & Reader in Morbid Anatomy in the University of Oxford]. **The Mycoses of the Spleen.**—pp. xii+169. With 17 figs. 1930. London: Kegan Paul, Trench, Trubner & Co., Ltd., Broadway House: 68–74, Carter Lane, E.C. [12s. 6d.]

The purpose of this book is to show that "splenic anaemia, acholuric jaundice and a group of cases with cirrhosis of the liver provisionally named Banti's disease have a common aetiology in that the spleen in most cases contains Gandy-Gamna nodules, that in the substance of these nodules can be found evidence of a mycotic invasion and that the organism belongs to the genus Nocardia."

After a general account of the various kinds of splenomegalies, clinical descriptions are given of 14 cases of splenic anaemia; 16 cases of Banti's disease; 6 cases of acholuric jaundice; and 6 cases of other diseases of the spleen. The following chapter is devoted to an anatomical and histological account of the infected spleens and a description of the mycelium-like structures observed in the Gandy-Gamna nodules in a number of cases —24 out of 56 cases examined. With respect to the mycotic organism claimed to be present, the author's conception that this organism may be a Nocardia [Actinomyces] in the outer part of the nodules and appear as thick, segmented hyphae resembling those of Aspergillus in the centre of the nodules would require very definite proof to be convincing. "The more central and probably older parts of the mycelial mass show more massive threads with septa and true branching. Their appearance here strongly suggests the appearance of the mycelia of one of the higher fungi such as aspergillus. . . ." Further, it is difficult to reconcile this view with the author's cultural results and the conclusions deduced therefrom, namely, that positive cultures invariably gave a Nocardia, which is the causal organism in such cases.

In the next chapter the results from spleen cultures and animal inoculation are described. In all, six cultures were obtained from infected spleens, of which four have been kept alive in culture. Of these four cultures, one was obtained from a case of acholuric jaundice; two from cases of splenic anaemia; and one from a case of Banti's disease. In all cases the organisms isolated were similar, and appear to be a new species of Nocardia which is named *Nocardia splenica*. *N. splenica* is not pathogenic for guineapig, rabbit, rat or mouse, but for monkeys it "is pathogenic and produces a slow illness leading to death." The monkeys used were *Macacus rhesus* (3), *M. sinicus* (9), and *Cercopithecus callitrichus* (4). In the inoculated animals the spleen was enlarged in practically all cases at some time, and all had tenderness in the region of the spleen; but in no case were Gandy-Gamna nodules developed, nor could hyphae be demonstrated in any organ. The same organism was recultivated from six of the monkeys.

The last chapter deals with the development of the mycotic hypothesis, and the author concludes that "the problem of the aetiology of these splenomegalies can only be proved by the repetition of the observations here detailed by numbers of other workers."

P. Tate.